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BOTANICAL SERIES

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VOLUME XVI

THE GENUS BIDENS

PART II

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BY

EARL EDWARD SHERFF
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B. E. DAHLGREN
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PUBLICATION 389

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THE GENUS BIDENS

EARL EDWARD SHERFF

102. **Bidens acuticaulis** Sherff, Bot. Gaz. 59: 301. 1915.
Pl. CIV, figs. *j–r*.

Herba annua, tenerrima, 4–9 dm. alta; caule acute angulato, ramoso; ramis adscendentibus, acutissime angulatis et fere subalatis, remote pubescentibus. Folia petiolata petiolis 2–10 mm. longis, petiolo adjecto 1–4 cm. longa, pinnata vel irregulariter bipinnata; foliolis (et lobis) linearibus, 0.5–1 mm. latis. Capitula multa, terminalia, radiata, pansa ad anthesin 3–4 mm. alta et 2.5–3.5 mm. lata (fructificantia demum 1–1.2 cm. alta et 4–5 mm. lata). Involucrum basi pubescens; bracteis exterioribus linearibus, plus minusve pubescentibus, 3–4 mm. longis; interioribus lanceolatis, 1.5–3 mm. longis. Flores ligulati circ. 4, parvi, subflavidi vel fere albi, 2-(4-) striati, 3–5 mm. longi. Achaenia anguste linearia, subnigra, plano-convexa, remotissime pubescentia, margine adscendenti-ciliata, apice erecto-hispida et biaristata, corpore 6–12 mm. longa et 0.5–0.9 mm. lata, aristis retrorsum hamosis 1.5–2 mm. longis.

Type specimen: Collected by *John Gossweiler*, No. 4052, in herb-grown woods, Kassuango-Kuiriri, Angola, April 4, 1906 (Brit., 2 sheets).

Distribution: Known only from type locality, Kassuango-Kuiriri, Angola.

Specimens examined: *Gossweiler* 4052 (type, Brit., 2 sheets).

EXPLANATION OF PLATE CIV, figs. *j–r*

Bidens acuticaulis: j, flowering and fruiting lateral branch of specimen, ×0.68; *k*, separate leaf, ×1.02; *l*, portion of an extremely sharp-angled branch, ×3.4; *m*, exterior involucral bract, ×6.79; *n*, interior involucral bract, ×6.79; *o*, ray corolla, ×6.79; *p*, palea, ×2.04; *q*, disc floret, ×6.79; *r*, achene, ×2.72; all from 2nd type sheet.

103. **Bidens oligocarpa** Sherff, Bot. Gaz. 92: 206. 1931.
Pl. LXXXII, figs. *j–l*.

Herba annua, erecta, gracilis, 4–6 dm. alta, caule ramisque acriter tetragonis et sparsissime hispidis. Folia petiolata petiolis tenuibus

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ciliatis usque ad 1.5 cm. longis, petiolo adjecto 4–8 cm. longa, pinnatim 3–5-partita; foliolis ovatis vel oblongo-lanceolatis, valde membranaceis, acriter serratis dentibus indurato-apiculatis, faciebus sparsim minuteque adpresso-hispidis, marginibus ciliatis, terminali usque ad 2 cm. lato et apice acuminato. Capitula pauca, ramos (pedunculos) tenuissimos usque ad 8 cm. longos terminantia, radiata, pansa ad anthesin circ. 1.2–1.6 cm. lata et 5–7 mm. alta. Involucri subglabri bracteae exteriores 5–7, tenuissime lineares, hispido-ciliatae, supra moderate dilatatae, apice acerrimae, 1.5–2.3 mm. longae; interiores late lanceolatae vel oblongo-ovatae, apice pubescentes, 3–3.5 mm. longae. Flores ligulati 4–5, rosacei, ligula oblongi vel anguste obovati, apice obtuso obsolete denticulati, 7–9 mm. longi. Achaenia circ. 6–8, linearia, obcompresso-tetragona, omnino circ. 8- (unica facie 2-) sulcata, atra, superne sensim angustata, exalata, plus minusve erecto-hispida setis e faciebus ipsis vel e papillis ortis, corpore 6–10.5 mm. longa et 0.7–0.9 mm. lata, apice biaristata aristis retrorsum hamosis, 0.4–1 mm. longis.

Type specimen: Collected by *C. E. Lloyd*, No. 409, State of Sonora, Mexico, 1890 (Gray).

Distribution: State of Sonora, Mexico.

Specimens examined: *Lloyd* 409 (type, Gray).

EXPLANATION OF PLATE LXXXII, FIGS. *j–l*

Bidens oligocarpa: j, cauline leaf, ×0.65; *k* (flowering), *l* (fruiting), heads, ×0.65; all from type.

104. **Bidens amphicarpa** Sherff, Bot. Gaz. 88: 290. 1929. Pl. LXXXII, figs. *a–i*.

Herba annua, gracilis, ramosa, 1–6 dm. alta; caule quadrangulato ac saepe purpurascenti, nunc pubescenti nunc glabrato. Folia tenuiter petiolata petiolis usque ad 2 cm. longis, petiolo adjecto usque ad 5 cm. longa, pinnatim 3–5-partita; foliolis valde membranaceis, glabratis vel sparsim adpresso-hispidis, ciliatis et plerumque minutissime atro-marginatis, unico latere grosse 1–4-serratis dentibus acerrime apiculatis, lateralibus ovatis, terminali lanceolato vel fere lineari. Capitula in pedunculis tenuissimis usque ad 1 dm. longis ramos terminantibus disposita, radiata, pansa ad anthesin tantum circ. 6–7 mm. alta et 8–10 mm. lata. Involucri bracteae exteriores 5–8, tenuiter lineares, basi extrinsecus marginaliterque superne tantum marginaliter hispidae, apice acerrime mucronatae, demum circ. 4 mm. longae, bracteis interioribus lanceolatis

BIDENS BIGELOVII Gray (figs. *a–k*)
BIDENS BIPINNATA L. (figs. *l–s*)

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atro-brunneis vel atro-purpurascentibus sed marginibus albido-diaphanis apice ciliatis plerumque subaequales. Flores ligulati circ. 5, ligula oblanceolati, 3–5 striis percursi, subflavidi vel subrosacei, apice saepe 2- (3-) dentati, 5–6 mm. longi; tubulosi 8–14. Achaenia exteriora subplana, unica facie circ. 4-sulcata, infra parce supra valde erecto-setosa, badia vel rubro-straminea, corpore 5–8 mm. longa, interiora tereti-quadrangulata, omnino 8-sulcata, maxima ex parte atra sed apice brunneo-straminea, erecto-setosa (interdum valde perspicueque tuberculato-setosa), elongato-linearia et supra saepe cervicem formantia, corpore demum 9–15 mm. longa; omnia recta vel subrecta, 2–3-aristata aristis tenuibus retrorsum hamosis, 2.5–4 mm. longis, demum saepe caducis.

Type specimen: Collected by *Townsend S. Brandegee*, Sierra de la Laguna, Lower California, January 23, 1899 (Calif.).

Distribution: Known only from Lower (Baja) California.

Specimens examined: *Brandegee*, Sierra de la Laguna, January 23, 1890 (type, Calif.); *idem*, Sierra de San Francisquito, March 28, 1892 (Field).

Differs from glabrous or subglabrous forms of the similarly amphicarpous *Bidens Anthriscoides* DC. in the dissection and outline of the leaflets, in its proportionately much longer external involucral bracts,[1] and in its straighter achenes. The general aspect is somewhat like that in stunted, slender forms of *B. pilosa* var. *bimucronata* f. *odorata* (Cav.) Sherff, but the very narrow external bracts and the dimensions of the flowering and fruiting heads (the latter with fewer achenes) distinguish it from that form.

EXPLANATION OF PLATE LXXXII, FIGS. *a–i*

Bidens amphicarpa: a, flowering and fruiting branch, ×0.65; *b*, *c*, exterior involucral bracts, ×5.22; *d*, interior involucral bract, ×5.22; *e*, ray corolla, ×5.22; *f*, palea, ×5.22; *g*, disc floret, ×5.22; *h* (outer but not outermost), *i* (inner), achenes, ×2.61; all from type.

105. **Bidens oligantha** Brandegee, Zoë 5: 224. 1905.
Pl. LXXXIII, figs. *a–h*.

Herba erecta, annua, 2–3 dm. alta; caule parce puberulento, simplici vel supra subramoso. Folia membranacea, breviter petiolata petiolis 2–8 mm. longis, petiolo adjecto plerumque 1–3 cm. longa,

[1] In *B. Anthriscoides* DC. the outer bracts are only about one-half or three-fifths the length of the inner ones, notwithstanding DeCandolle's original description ("invol. squamis. . .inter se subaequalibus": Prodr. 5: 601. 1836).

lamina glabrata, trifida vel tripartita; foliolo terminali linearilanceolato, acuminato, plus minusve serrato, 1.5–2 cm. longo, lateralibus ovato-acuminatis, serratis vel inciso-serratis, 5–8 mm. longis. Capitula pauca, tenuissime pedunculata pedunculis 6–10 cm. longis, radiata, pauciflora (floribus tubulosis circ. 6–12), pansa ad anthesin ± 5 mm. lata et ± 4 mm. alta. Involucri bracteae exteriores ± 5, lineares, perspicue ciliatae, apice acres, circ. 3 mm. longae, interioribus ovato-lanceolatis late diaphano-marginatis interdum fere aequales. Flores ligulati circ. 4–5, albidi vel subrosacei, purpureostriati, circ. 3 mm. longi, triangulato-obovati. Achaenia pauca, recurvata, tenuiter linearia, subplana, nigra, glabra vel ad angulos valde tuberculato-hispida, biaristata (vel interdum exaristata ex Brandeg.), aristis (retrorsum hamosis hamis perpaucis vel demum calvis) circ. 1 mm. longis; pauca crassiuscula supra et corpore circ. 5 mm. longa, reliqua attenuata supra (et plerumque corpore 7–10 mm. longa! Brandeg. 5 mm. dixit inaccurate!).

Type specimen: Collected by *Townsend S. Brandegee* at Cofradía (vicinity of Culiacán), State of Sinaloa, Mexico, October 21, 1904 (Calif.).

Distribution: Known only from type locality in the State of Sinaloa, Mexico.

Specimens examined: *Brandegee*, Cofradía, October 21, 1904 (type, Calif.: cotypes, Field; Gray).

EXPLANATION OF PLATE LXXXIII, FIGS. *a–h*

Bidens oligantha: a, flowering and fruiting specimen, ×0.68; *b*, exterior involucral bract, ×4.77; *c*, interior involucral bract, ×4.77; *d*, ray corolla, ×4.77; *e*, palea, ×4.77; *f*, disc floret, ×4.77; *g* (outer), *h* (inner), achenes, ×2.72; all from cotype, in Hb. Gray.

106. **Bidens Andrei** Sherff, Bot. Gaz. 61: 495. 1916.
Pl. LXXXIV, figs. *k–s*.

Herba (ad basim suffrutescens?), 1–2 m. alta, glabrata, caule tetragono et striato; ramis tetragonis, striatis, (superioribus) irregulariter arcuatis et in nonnullos ramulos (vel pedunculos) divisis. Folia petiolata petiolis 0.3–2 cm. longis basi connatis, petiolo adjecto 2.5–7 cm. longa, bi- vel tri-(vel quadri-) pinnata, supra minute et non dense adpresso-hispida; ultimis segmentis linearibus, integris vel lobulatis, indurato-apiculatis. Capitula multa, tenuiter pedunculata pedunculis 4–12 cm. longis, radiata, pansa ad anthesin tantum 5–6.5 mm. lata et circ. 4 mm. alta, demum (in fructu) usque ad 1 cm. alta. Involucrum basi plus minusve hispidum, bracteis demum

BIDENS LEPTOCEPHALA Sherff

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valde et perspicue reflexis; exterioribus (circ. 6) linearibus, apiculatis, subsparsim pubescentibus, tantum 1–2 mm. longis; interioribus lanceolatis, membranaceis, 2–3 mm. longis, margine diaphanis. Flores ligulati (6 vel pauciores) ligula lanceolati, 4–5-striati, apice integri, 3–4 mm. longi, in specimine sicco subalbi. Achaenia tenuissime attenuato-linearia, tetragona, ad apicem brunnea, alibi atra, supra sparsim erecto-hispida, corpore 0.5–1 cm. longa et tantum 0.3–0.6 mm. lata, biaristata aristis glabris vel retrorsum hamosis, usque ad 1.6 mm. longis.

Type specimen: Collected by *Edouard François André*, No. 2878, at altitude of 1,250 meters, Río Juanambu, Colombia, April 28, 1876 (Gray).

Distribution: Known only from type locality, Río Juanambu, Colombia.

Specimens examined: *André* 2878 (type, Gray: cotype, Kew).

The type specimen was restudied in 1922 and again in 1925. The 20–30 areolae on the old disks become prominent as the involucres reflex. There are 37 heads on the type. The plant appears to be entirely herbaceous, but the label says "suffrutesc.," hence the lower part of the plant (not present on the sheet) may have been woody. The species stands very close to *B. pilosa* var. *alausensis* f. *scandicina* (H.B.K.) Sherff, from which it appears to differ in its taller stature, more acutely tetragonal stems, longer internodes, finally much reflexed involucres, and, most of all, its very minute flowering heads, these measuring only about 4 mm. high and equally wide.[1]

EXPLANATION OF PLATE LXXXIV, FIGS. *k–s*

Bidens Andrei: k, flowering and fruiting specimen, ×0.65; *l*, top of peduncle showing areolate receptacle and involucre reflexed in age, ×9.16; *m*, portion of leaf showing pubescence, ×5.23; *n*, exterior involucral bract, ×5.23; *o*, interior involucral bract, ×5.23; *p*, ray corolla, ×5.23; *q*, palea, ×5.23; *r*, disc floret, ×5.23; *s*, achene, ×3.92; all from type.

107. **Bidens Anthriscoides** DC. Prodr. 5: 600. 1836; cf. Sherff, Bot. Gaz. 61: 497. 1916. Pl. LXXXIII, figs. *i–q*.

Folia tripartita.....*B. Anthriscoides* sensu stricto.
Folia bipinnata.....var. *β. decomposita.*

[1] It may be observed that in the somewhat comparable case of *B. ramosissima* Sherff the finally reflexed involucres and the minute size of the flowering heads were later concluded to be only subformal variations of *B. pilosa* var. *bimucronata* f. *odorata* (Cav.) Sherff.

Annua, erecta vel suberecta, ramosa, tota dense pubescenti-hirta vel etiam glabriuscula, 3–5 dm. alta; caule ramisque acriter tetragonis. Folia tenuiter petiolata petiolis 0.5–3 cm. longis, petiolo adjecto 3.5–9 cm. longa, membranacea, ciliata, tripartita, infimorum foliolis lateralibus ovatis acutis subaequalibus medio vix dissimilibus, mediorum superiorumque foliolis lateralibus ovatis medio duplo longiore petiolulato lanceolato utrinque attenuato, omnibus serratis. Capitula ramulos terminantia, radiata, pansa ad anthesin 8–11 mm. lata et 5–9 mm. alta, tenuiter pedunculata pedunculis 1–8 cm. longis. Involucrum tomentosulum vel breviter hispidulum; bracteis exterioribus 6–8, adpressis vel subsquarrosis, linearibus, apice acerrime indurato-mucronulatis, tantum 1.5–3 mm. longis et non interiores lanceolatas subaequantibus (DeCandolleus *invol. squamis disco et inter se subaequalibus* dixit per errorem!); interioribus 4–5 mm. longis. Flores ligulati 3 vel 4, parvi, ligula obovato-elliptici, leviter vel valde rosacei (exsiccati saepe subflavidi), apice truncato vel emarginato obtuse (saepius tri-) dentati, circ. 5 mm. longi. Achaenia pauca, 3–12 in unico capitulo; exteriora linearia vel lineari-fusiformia, valde obcompressa, flavido-brunnea vel rufo-badia, conspicue tuberculato-setulosa, corpore 6–7 mm. longa; interiora tenuissime elongato-linearia, supra attenuata sed non vero rostrata, subrecta vel saepius recurvata, atra, plus minusve tetragona, tuberculis saepe flavidis tuberculato-setulosa vel saepe una facie glabrata, corpore 9–21 mm. longa; omnia superne demum late distantia, apice breviter biaristata; aristis stramineis, retrorsum hamosis, 0.2–3 mm. longis.

Type specimen: Collected by *Jean Luis Berlandier*, No. 1010, Cordillera de Guchilaque (near Cuernavaca, State of Morelos), Mexico, October, 1827 (Del.).[1]

Distribution: Southwestern Mexico.

Specimens examined: *Berlandier* 1010 (type, Del., 3 sheets: cotypes, Brit.; Flor.; Par.); *idem* 1152, Cordillera de Guchilaque, Mexico, October, 1827 (Del., 2 sheets; Flor., aristis saepe brevibus vel obsoletis; Par.); *C. G. Pringle* 11822 pro parte, ravine near Guadalajara, Jalisco, October 17, 1903 (Field).

As stated before (Sherff, loc. cit.), examination of cotype material in London (Brit.) and Paris (Par.) shows the species to have radiate heads, not discoid as described by DeCandolle, exterior involucral bracts much shorter than the interior, not subequal, and some of the

[1] No. 1010 is the first cited specimen and hence may pass as the type. De Candolle founded the species upon Berlandier's Nos. 1010 and 1152, both from the same locality. The specimens are identical.

achenes reaching a total length of 2.1 cm. The type and cotype specimens are of the very pubescent form and have tripartite leaves.

Bidens Anthriscoides var. *β.* **decomposita** Sherff, Bot. Gaz. 80: 380. 1925.

A specie foliis bipinnatis (segmentis ultimis oblongo-ovatis, calloso-apiculatis) differt.

Type specimen: Collected by *Cyrus Guernsey Pringle*, No. 11822 pro parte, ravine (barranca) near Guadalajara, State of Jalisco, Mexico, October 17, 1903 (Kew).

Distribution: Known only from type locality, near Guadalajara, State of Jalisco, Mexico.

Specimens examined: *Pringle* 11822 pro parte (type, Kew: cotypes, Berl.; Gray; U.S.).

Pringle 11822 in the Herbarium of Field Museum has the leaves tripartite and matches the type material of *B. Anthriscoides* DC. (*Berlandier* 1010, Del.; Brit.; Par.) fairly well except in being glabrate. Elsewhere, the specimens of *Pringle* 11822 are seen to have delicately bipinnate leaves, similar to those of *B. pilosa* var. *bimucronata* f. *odorata* (Cav.) Sherff. Through this form, apparently best regarded as a variety, *B. Anthriscoides* DC. is found to be rather closely related to a form (the *B. inermis* Wats.) of *B. pilosa* var. *bimucronata* f. *odorata* (Cav.) Sherff.[1]

EXPLANATION OF PLATE LXXXIII, FIGS. *i–q*

Bidens Anthriscoides: i (lower), *j* (upper), portions of flowering and fruiting specimen, ×0.68; *k*, exterior involucral bract, ×4.77; *l*, interior involucral bract, ×4.77; *m*, ray floret, ×4.77; *n*, palea, ×4.77; *o*, disc floret, ×4.77; *p* (outer), *q* (inner), achenes, ×2.72; all from *Berlandier* 1010 (type collection)—*i*, *j*, mainly from sheet in Hb. Brit., but partly from sheets in Hb. Par.; *k*, *l*, *n–q*, from sheet in Hb. Brit.; *m*, from sheet in Hb. Par.

108. **Bidens Chrysanthemifolia** (H.B.K.) Sherff, Bot. Gaz. 61: 501. 1916. Pl. LXXXV.

Cosmos Chrysanthemifolius H.B.K. Nov. Gen. et Sp. 4: 188 (239) and *pl. 382*. 1820.

Cosmea Chrysanthemifolia (H.B.K.) Spreng. Syst. Veg. ed. 16. 3: 615. 1826.

Cosmos Chrysanthemoides H.B.K. ex DC. Prodr. 5: 607. 1836.

[1] The var. *decomposita* is not to be confused with the var. *angustiloba* DC., a plant referable to *B. duranginensis* Sherff (q.v.).

Cosmea Chrysanthemoides H.B.K. ex Heynhold, Nomencl. 222. 1840.

Bidens Kunthii Schz. Bip. in Seemann, Bot. Voy. Herald 308. 1852–1857.

Bidens parvulifolia Sherff, Bot. Gaz. 56: 490. 1913.

Herba ut videtur interdum perennis, breviter et dense pilosa vel maxima ex parte glabrata; caule subsimplici, adscendenti vel plus minusve repenti, tetragono, 1.5–4 dm. longo. Folia petiolata petiolis ciliatis pilosiusculisque 4–13 mm. longis, petiolo adjecto 1–2.5 cm. longa, variabilia; nunc pinnato-quinquepartita, circumambitu ovato-triangularia, foliolis oppositis, duobus inferioribus tri- vel quinquefidis, tribus superioribus trifidis, segmentis obovato-cuneatis et quibusdam apice bi- vel trilobis lobis acutis; nunc etiam fere omnia indivisa, ovata, acuta vel subacuminata, serrata. Capitula terminalia, solitaria vel subsolitaria, longe tenuiterque pedunculata pedunculis 5–17 cm. longis et plerumque glaberrimis, erecta, radiata, pansa ad anthesin 2–3.3 cm. lata et circ. 6–8 mm. alta. Involucrum basi hispidum vel omnino glabrum; bracteis exterioribus 7 vel 8, linearibus vel superne saepe subdilatatis, saepe subcarnosis, apice plerumque obtusis, margine costaque mediana raro paucis pilis instructis, 2.5–3.5 mm. longis; interioribus lanceolatis, 5–6 mm. longis. Flores ligulati 5–8, rosacei (vel in speciminibus exsiccatis saepe subflavidis), ligula oblongo-elliptici vel oblanceolati, apice obsolete denticulati, 1–1.5 cm. longi. Achaenia linearia et inferne subattenuata, obcompresso-tetragona, glabra, nigra, corpore 4.5–7 mm. longa, biaristata; aristis aurantiaco-flavidis, tenuibus, supra retrorsum hamosis, 1.2–1.8 mm. longis.

Type specimen: Collected by *Alexander Humboldt* and *Aimé Bonpland*, 1799–1804, the locality uncertain; thought by Kunth to have come perhaps from Mexico, but it is known at present only from Guatemala (Par.).

Distribution: Known only from Department of Amatitlán, Guatemala.

Specimens examined: *Heyde & Lux* 6162, alt. 900 meters, Fraijanes, September, 1893 (Berl.; Boiss.; Brit.; Field; Kew; U.S.; nom. vernac., mosote); *iidem* 6163, Guatemala (Field, type of *Bidens parvulifolia* Sherff); *iidem* 6173, alt. 900 meters, Fraijanes, September, 1893 (Berl.; Brit.; Boiss.; Field; Kew); *Humboldt & Bonpland*, loco ignoto (type, Par.); *W. A. Kellerman* 6112, alt. 2,490 meters, crater of Volcán de Pacaya, January 6, 1907 (Field); *Scherzer*, alt. 2,700–3,300 meters, Volcán de Pacaya, August, 1854 (Mus. V., sub nom. *Bidente pacayae* Schz. Bip.).

BIDENS ENGLERI O. E. Schulz (figs. *a–f*)
BIDENS CYLINDRICA Sherff (figs. *g–l*)

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This species was stated definitely by DeCandolle (loc. cit.) to come from Mexico, but Kunth (H.B.K. loc. cit.) was uncertain as to its native country. It is known definitely only from Guatemala. DeCandolle commented upon the closer affinity of the achenes with those of *Bidens* than with those of *Cosmos*. Whether he altered the specific name through intent or through error, I am unable to say.[1] But later, Schultz Bipontinus (Seemann, loc. cit.), who frankly declared his belief that *Cosmos* was not a valid genus, used this altered name in citing it as a basis for his *Bidens Kunthii*, which latter name, according to the International Rules, cannot stand.

Asa Gray (Proc. Amer. Acad. 19: 16. 1884) strongly suspected that this plant was merely *Bidens humilis* H.B.K. and suggested a reexamination of the type material. Kunth (H.B.K. loc. cit.) had described the color of the ligules as "violacea, basim versus sulphurea." This description is borne out, not only by the coloring in the plate cited (that is, in copies of Kunth's work having the plates colored, as in John Crerar Library, Chicago), but by the type specimen in Paris, clearly the one from which the plate was made. This specimen, though faded as to its rays, shows at least that the proximal ends of the rays were colored differently from the remaining portions, which latter seem surely to have been some shade of red.

More recently, there has been collected in the Department of Amatitlán, Guatemala, fine material, *Heyde & Lux* 6173, which belongs here. Singularly enough, it had been determined by John Donnell Smith as *Bidens humilis* (cf. Gray, loc. cit.), but the roseate rays and more or less *Cosmos*-like aspect are very distinct. The color of the rays in the dry condition varies from a pronounced roseate to a faded yellowish color, rather than showing a distinct sulphureous color definitely located toward the base as described by Kunth. Still further material from the same small district in Guatemala, *W. A. Kellerman* 6112, has been collected and fortunately is in a more mature condition. The ripe achenes match the ovary figured by Kunth and show that there is not the slightest tendency to become rostrate as in most species of *Cosmos*.

An examination of the original description of *Bidens parvulifolia* (Sherff, loc. cit.) shows that the second cited specimen, *Heyde &*

[1] In his Prodromus Herbarium DeCandolle had mistaken a single large specimen of *Bidens pilosa* var. *bimucronata* f. *odorata* (Cav.) Sherff for this species. The original label had said "*Bidens* Cavanilles" and from the peculiar *facies* of the plant, the writing, etc., it is clearly one of the original specimens of *Bidens odorata* Cav. that had been sent out by Cavanilles. On the cover, DeCandolle originally had written "*B. Chrysanthemoides?* H.B.K." but later had changed the "*B.*" to "*C.*"

Lux 6162, seen in the United States National Herbarium, was obtained by the same collectors at the same altitude, locality, and time as *Heyde & Lux* 6173. The dried ligules were yellowish, the leaves were pubescent, and all but the top pair were simple. Since then I have found other specimens (*Heyde & Lux* 6162) showing numerous intergradations between the simple, pubescent leaves and the compound, mainly glabrous leaves; also, variations to a roseate color are shown in the rays. Thus *Bidens parvulifolia*, incredible as it may seem to any botanist who does not have at hand the intermediate specimens, must be interpreted as merely a form of *Bidens Chrysanthemifolia* having minute, mainly undivided leaves.

B. Chrysanthemifolia offers a perplexing approach to *B. pilosa* var. *bimucronata* f. *odorata* (Cav.) Sherff. It seems significant, however, that among the large number of specimens of the rather widely distributed f. *odorata* examined from elsewhere than in the Department of Amatitlán, Guatemala, none have been found to present the gradations from glabrous, decompound to pubescent, undivided leaves that *B. Chrysanthemifolia* presents.

EXPLANATION OF PLATE LXXXV

Bidens Chrysanthemifolia: a, c, flowering branches, ×0.61; *b,* leaf and portion of adjacent stem enlarged to show pubescence, ×1.22; *d–i,* various pinnate or bipinnatisect cauline leaves, ×0.61; *j,* exterior involucral bract, ×4.89; *k,* interior involucral bract, ×4.89; *l,* ray corolla, ×4.89; *m,* palea, ×4.89; *n,* disc floret, ×4.89; *o* (outer), *p* (inner), achenes, ×2.4; *a, b,* from *Heyde & Lux* 6163 (type of *Bidens parvulifolia* Sherff), in Hb. Field; *c, j–p,* from *Heyde & Lux* 6162, in Hb. U.S.; *d–h,* various cauline leaves from *Heyde & Lux* 6173, in Hb. Kew; *i,* cauline leaf from type.

109. **Bidens mollifolia** Sherff, Bot. Gaz. 64: 21. 1917.
Pl. LXXXVI.

Herba annua, 1.2–1.8 m. alta (ex inscriptione Pringlei); caule et ramis plus minusve acute tetragonis, subviridibus vel purpurascentibus, dense tomentosis (vel supra etiam fere glabris); ramis ad finem liberum in aliquot ramulos vel pedunculos divisis, ut quaeque planta 30–60 capitula habeat. Folia petiolata petiolis dense tomentosis basi connatis 0.3–2.5 cm. longis, petiolo adjecto 2–9 cm. longa, ternata vel pinnata, dense et molliter pilosiuscula vel tomentosula, infra pallidiora; foliolis (3–7) ovatis vel lanceolatis, serratis, lateralibus (infimis interdum ternatis) 1–3.5 cm. longis et 0.5–2 cm. latis, terminali 1.8–5 cm. longo et 0.7–2.3 cm. lato. Capitula breviter

BIDENS PSEUDALAUSENSIS Sherff (figs. *a–g*)
BIDENS CORNUTA Sherff (figs. *h–n*)

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pedunculata pedunculis 0.5–3 cm. longis, radiata, 5–7 mm. alta et ad anthesin ligulis adjectis (etiam cum achaeniis) 1.5–2 cm. lata. Involucrum basi hispidum, bracteis exterioribus 6–8, linearibus, ad apicem obtusis, sparsim hispidis et plus minusve ciliatis, 2–3 mm. longis; interioribus lanceolatis, maxima ex parte glabris, 3–5 mm. longis. Flores ligulati circ. 5, ligula obovati vel oblanceolati, rosacei, 3–7-striati, apice 2–4-lobulati lobulis subrotundis, 0.8–1 cm. longi. Paleae lineares demum 5–7 mm. longae, terminis tortis achaenia demum superantes. Achaenia subtetragona, clavae simillima, infra angustiora, apice calva et areolata, atra, glabra, 3–6.5 mm. longa.

Type specimen: Collected by *Cyrus Guernsey Pringle*, No. 6050, at altitude of 2,250 meters, Sierra de San Felipe, State of Oaxaca, Mexico, November 16, 1894 (Gray).

Distribution: Known only from State of Oaxaca, Mexico.

Specimens examined: *E. W. Nelson* 1176 pro parte, alt. 2,850–3,300 meters, vicinity of Sierra de San Felipe (Cerro San Felipe), September 1, 1894 (U.S.); *idem* 1363, alt. 2,250–2,850 meters, 18 miles southwest of City of Oaxaca, September 10–20, 1894 (Gray); *idem* 1476 pro parte, alt. 1,650–2,250 meters, Valley of Oaxaca, September 20, 1894 (Gray); *Pringle* 6050 (type, Gray: cotypes, Berl.; Boiss.; Brit.; Carn.; Del.; Field; Kew; Mo.; Mun.; Mus. V.; N.Y.; Par.; Phila.; U.V., etc.).

A species of highly restricted distribution. It appears most closely related to *Bidens pilosa* var. *calcicola*, which at times offers a strong resemblance. The clavate achenes of *B. mollifolia*, however, seem very distinctive.

EXPLANATION OF PLATE LXXXVI

Bidens mollifolia: a (upper), *b* (lower), portions of flowering and fruiting specimen, ×0.55; *c*, small portion of same enlarged to show pubescence, ×1.66; *d*, exterior involucral bract, ×3.32; *e*, interior involucral bract, ×3.32; *f*, ray corolla, ×3.32; *g*, palea, ×3.32; *h*, disc floret, ×3.32; *i*, achene, ×3.32; all from type.

110. **Bidens Abadiae** DC. Prodr. 5: 601. 1836.

Pl. LXXXVII, figs. *a*, *c–i*.

Folia bipinnatisecta ..... *B. Abadiae* sensu stricto.

Folia pinnatim 3–5-partita ..... var. *β. pilosoides*.

Herba annua, erecta, ramosa, pilis albidis plus minusve villoso-hirsuta, caule tetragona, probabiliter 4–9 dm. alta, internodiis elongatis quam foliis multo longioribus. Folia petiolata petiolis 1–4

cm. longis, petiolo adjecto 7–15 cm. longa, circumambitu late triangulata, bipinnatisecta; segmentis principalibus 2–3 jugis, membranaceis, anguste oblongo-ovatis, grosse inciso-dentatis terminali trilobo basi cuneato, infra (exsiccatis) multo pallidioribus, dentibus obtusis abrupte mucronatis. Capitula non numerosa, pedunculata pedunculis ± 2–4 cm. longis, breviter radiata, pansa ad anthesin circ. 1.5 cm. lata et 6–9 mm. alta. Involucri bracteae glabrae vel villoso-hirsutae, subaequales, 5–7 mm. longae; exteriores moderatim lineares, supra dilatatae, apice acriter apiculatae; interiores lanceolatae vel ovato-lanceolatae. Flores ligulati 4–6, pro capitulo parvi, exsiccati albi, ligula ovati, circ. 5–7-striati, 6–8 mm. longi. Achaenia linearia, subtetragona, atra, omnino circ. 8-sulcata, supra marginibus et costis medianis adrecte setosa, corpore 4.6–6 mm. longa et 0.5–1 mm. lata, 2- vel 3-aristata aristis brunneo-stramineis retrorsum hamosis plerumque 1.5–2 mm. longis.

Type specimen: Collected by *Abadia* around Lima, Peru, in 1833 (Del.).

Distribution: Vicinity of Lima, Peru; also in Ecuador and Colombia.

Specimens examined: *Abadia*, Lima, Peru, 1833 (type, Del.); *Bro. Ariste-Joseph A*832, Choaclú, above Bogotá, Colombia, July (U.S.; forma internodiis longissimis); *Alexander Mathews* 738, Lima (Kew); *A. Mille* 387, in cultivated places, Cotocollso, Ecuador, February, 1922 (U.S.); *Luis Mille* 486, in cultivated places, June, 1904 (U.S.; forma); ex *herb. Pavonii*, Lima and Chancay, Peru (Boiss.; Flor.).

Bidens Abadiae DC. was founded upon a specimen collected at Lima, Peru, in 1833. The leaves of the type are bipinnatisect, and the general aspect of the foliage is comparable with that of *B. pilosa* var. *bimucronata* f. *odorata* (Cav.) Sherff. In the Boissier Herbarium is the plant from the Pavón Herbarium, and collected at Lima or in its vicinity, a plant matching the type very closely in its bipinnatisect foliage. The technical characters of both the old and young heads on these plants are very similar to those often met with in *B. pilosa* L. The general habit is so distinct, however, that to equate *B. Abadiae* and *B. pilosa* would seem unjustifiable.

Bidens Abadiae var. *β.* **pilosoides** Sherff, Bot. Gaz. 81: 40. 1926. Pl. LXXXVII, fig. *b*.

A specie foliis pinnatim 3–5-partitis foliolis ovatis vel terminali lanceolato omnibus serratis vel incisis apice obtusis vel acutis capitulis plerumque eradiatis diversa; habitu *B. pilosae* adpropinquans.

Type specimen: Collected by *Hugh Cuming*, No. 1041, Lima, Peru, in 1831 (Kew, 2 sheets).

Distribution: Peru.

Specimens examined: *Cuming* 1041 (type, Kew, 2 sheets); *W. Nation*, cultivated places, Lima, 1862 (Kew); ex *herb. Pavonii* ex Peru (Webb); *Dr. & Mrs. J. N. Rose* 18740 p. p., Santa Clara, July 18, 1914 (N.Y.).

In the Webb Herbarium at Florence is the additional specimen (just cited) from the Pavón Herbarium, and collected in Peru. This has the leaves merely tripartite, with the terminal lobe subtripartite. The specimens by Cuming and by Nation, all from Lima, likewise differ from the DeCandolle type of *B. Abadiae* in having leaves only once-divided. One of the Cuming specimens has leaves approaching those of the related *B. pilosa* var. *alausensis* (H.B.K.) Sherff. Since the difference between the simply pinnate and the bipinnatisect types of foliage appears here to be emphatic, as in the varieties of *B. pilosa*, I have given the name *pilosoides* to the variety having 3–5-partite leaves.

EXPLANATION OF PLATE LXXXVII

Bidens Abadiae, figs. *a*, *c–i*: *a*, flowering and fruiting specimen, ×0.52; *c*, portion of leaf enlarged to show pubescence, ×3.14; *d*, exterior involucral bract, ×3.14; *e*, interior involucral bract, ×3.14; *f*, ray corolla, ×3.14; *g*, palea, ×3.14; *h*, disc floret, ×3.14; *i*, achene, ×3.14; all from *hb. Pavón*, Lima and Chancay, Peru, in Hb. Boiss.

Bidens Abadiae var. *pilosoides*, fig. *b*: cauline leaf, ×3.14; from *W. Nation*, Lima, Peru, 1862, in Hb. Kew.

111. **Bidens Brandegeei** Sherff, Bot. Gaz. 64: 38. 1917.
Pl. LXXXVIII, figs. *a–k*.

Herba annua, erecta (nisi infra plus minusve arcuata), 3–5 dm. alta, maxima ex parte albido-hispida, caule quadrangulato striato, ramis tenuibus rursus ramosis. Folia petiolata petiolis 0.2–2.5 cm. longis, petiolo adjecto 1–8 cm. longa, pinnata vel bipinnata, supra minus albido-hispida; foliolis 3–5, ovatis (vel ovato-lanceolatis) serratisque et iis *Bidentis pilosae* L. similibus vel pinnato-partitis, lobulis vel dentibus indurato-apiculatis. Capitula pauca, terminalia, radiata, tenuiter pedunculata pedunculis monocephalicis et 3–8 cm. longis. Involucri bracteae subaequales, exteriores (circ. 8) lineares, 1-nervatae, apiculatae, albido-ciliatae et -hispidae, 4–5 mm. longae; interiores lanceolatae, membranaceae, glabratae vel pubescentes,

margine diaphanae. Flores ligulati circ. 5, ligula obovati, in specimine sicco albido-flavi, 7–9-striati, ad apicem obscure dentati, 1–1.3 cm. longi. Achaenia (submatura) attenuato-linearia, striata, exaristata, supra antrorsum hispida, 4–6 mm. longa.

Type specimen: Collected by *Townsend S. Brandegee*, in vicinity of San Luis Tultitlanapa, State of Puebla, near the Oaxaca boundary line, Mexico, 1908 (Calif., 2 sheets).

Distribution: Known only from type locality, vicinity of San Luis Tultitlanapa, State of Puebla (near Oaxaca boundary line), Mexico.

Specimens examined: *Brandegee*, vicinity of San Luis Tultitlanapa, 1908 (Calif., first type sheet); *idem*, eodem loco, July, 1908 (Calif., second type sheet); *C. A. Purpus* 4429, eodem loco, August, 1908 (Calif.).

The first type sheet bears two fine specimens, the larger one having its leaves bipinnately divided. The specimens on the second type sheet have the leaves mainly 3–5-partite, as in *B. pilosa*. The achenes suggest those of *B. pilosa* var. *bimucronata*. The ray florets suggest the ray florets of *B. pilosa* var. *radiata*. The combination of achenial and radial characters with the strange general aspect (especially in the case of the first specimen, with its bipinnate and particularly white-hispid foliage) is one that I have never observed in authentic material of *B. pilosa*. It seems best, therefore, to retain *B. Brandegeei* as a separate species.

EXPLANATION OF PLATE LXXXVIII, FIGS. *a–k*

Bidens Brandegeei: a, flowering and fruiting specimen, ×0.57; *b*, *c*, more compound cauline leaves than in *a*, ×0.57; *d*, small part of plant enlarged to show pubescence, ×1.7; *e*, exterior involucral bract, ×4.54; *f*, interior involucral bract, ×4.54; *g*, ray corolla, ×2.27; *h*, palea, ×4.54; *i*, *j*, disc florets, ×4.54; *k*, achene, ×4.54; *a*, *e–k*, from left-hand specimen on 2nd type sheet; *b*, from right-hand specimen on 2nd type sheet; *c*, *d*, from left-hand specimen on 1st type sheet.

112. **Bidens aequisquama** (Fern.) Sherff, Bot. Gaz. 64: 26. 1917. Pl. CIX, figs. *k–t*.

Bidens rosea var. *aequisquama* Fern. Proc. Amer. Acad. 43: 68. 1907.

Herba ± 5 dm. alta; caule ramisque pubescentibus vel subglabris, quadrangularibus, striatis. Folia petiolata petiolis 0.4–1.8 cm. longis hispidis ad basim connatis, petiolo adjecto 3–8.5 cm.

longa, indivisa vel tripartita, ciliata, supra subglabra, infra sparsim adpresso-hispida et pallidiora; indivisa lanceolata, subcrasse serrata; foliolis foliorum tripartitorum similiter serratis, terminali ovato vel lanceolato, lateralibus ovatis et subsessilibus et minoribus. Capitula terminalia, radiata, pedunculata pedunculis 1–6 cm. longis et ad apicem creberrime albido-pubescentibus. Involucrum basi hispidum; bracteis exterioribus 9–16, linearibus, hispidis, 2–4 mm. longis; interioribus subaequalibus, lanceolatis, glabris vel ad apicem et longitudinaliter medio hispidis, margine diaphanis. Flores ligulati circ. 8, rosei, striati, apice irregulariter 2–4-dentati, saepius 9–11 mm. longi et 6–8 mm. lati. Achaenia nigra, linearia, ad apicem plus minusve hispida, biaristata, corpore 4.5–7 mm. longa, aristis flavis retrorsum hamosis 2.5–3 mm. longis.

Type specimen: Collected by *Cyrus Guernsey Pringle*, No. 10109, in thickets at altitude of 1,500 meters, near Uruapan, Michoacán, Mexico, November 1, 1905 (Gray).

Distribution: Michoacán, Mexico.

Specimens examined: *Bro. G. Arsène*, alt. 2,100 meters, Quinceo, near Morelia, 1910 (Field, 3 sheets); *idem* 3198, alt. 2,800 meters, Quinceo, November 11, 1909 (Berl.; Gray; Mo.); *idem* 5797, eodem loco, 1910 (Gray; Mo.; N.Y.; U.S.); *idem* 6774, Dos Teteras, alt. 2,500 meters, vicinity of Morelia, October 26, 1911 (Mo.; U.S.); *C. G. Pringle* 10109 (type, Gray: cotypes, Berl.; Brit.; Boiss.; Cop.; Del.; Field; Kew; Mo.; Mun.; Mus. V.; Phila.); *idem* 13420, Farascón, October 11, 1904 (U.S.).

EXPLANATION OF PLATE CIX, FIGS. *k–t*

Bidens aequisquama: k, l, flowering and fruiting specimens, ×0.62; *m,* separate leaf, ×0.62; *n,* lower surface of portion of leaf showing pubescence, ×1.24; *o,* exterior involucral bract, ×3.71; *p,* interior involucral bract, ×3.71; *q,* ray corolla, ×3.71; *r,* palea, ×3.71; *s,* disc floret, ×3.71; *t,* achene, ×3.71; all from cotype, in Hb. Field.

113. **Bidens Bigelovii** A. Gray in Torr. Bot. Mex. Bound. 91. 1858. Pl. LXXXIX, figs. *a–k.*

Planta austro-mexicana.....var. *β. pueblensis.*
Planta a Sonora borealiter distributa...*B. Bigelovii* sensu stricto.

Herba annua, erecta, fere glabra, 4–10 dm. alta; caule tetragono, gracili, ramoso. Folia petiolata petiolis 1–2.5 cm. longis, petiolo adjecto usque ad 8 cm. longa, tripartita, segmentis 3–5-partitis,

lobis oblongis vel cuneatis et paucius pinnatifido-incisis dentibus mucronatis, membranaceis, plus minusve ciliatis. Capitula subsolitaria, tenuiter pedunculata pedunculis usque ad 15 cm. longis, discoidea vel subradiata, pansa ad anthesin circ. 6–9 mm. lata et aequaliter alta. Involucrum basi hispidum; bracteis exterioribus 6–9, linearibus, tergo glabratis, margine ciliatis, termino acriter apiculatis, 5–7.5 mm. longis; interioribus lanceolatis, saepe brevioribus. Flores ligulati deficientes vel 3–5, albidi, ligula oblongo-obovati, 5–7 mm. longi. Achaenia subtetragona, dimorpha; 1–4 exteriora lineari-cuneata, truncata, papilloso-hispidula et scaberrima, saepe rufo-badia, corpore circ. 5–7 mm. longa, apice nunc obsolete aristata nunc manifeste 2–3-aristata aristis retrorsum hamosis et usque ad 1.5 mm. longis; cetera anguste linearia, atra, infra glabrata supra plerumque erecto-hispida, corpore 8–12 mm. longa, apice 2–3-aristata aristis retrorsum hamosis 1.5–3 mm. longis.

Type specimen: Collected by *John Milton Bigelow*, No. "582(*b*)," on banks of Limpio Creek (Rio Limpio), Texas, July 19, 1852 (Gray).

Distribution: Northern Colorado to southern New Mexico and southern Arizona, also reaching slightly into northern Sonora, Mexico.

Specimens examined: *Bigelow*, banks of Limpio Creek, etc. (type, Gray: cotype, N.Y.);[1] *idem*, mountain arroyo, Rock Creek, Texas, July (Gray; ab A. Grayo pro varietate innominata, achaeniis triaristatis exterioribus longioribus habitum); *J. C. Blumer* 1486, alt. 1,650 meters, Miss Rhoda Riggs' Ranch, along creek, Chiricahua Mts., Arizona, October 22, 1906 (Field; Gray); *idem* 1711, alt. 1,590 meters, in shade, on sandy alluvium, near Cedar Gulch, Paradise, Chiricahua Mts., Arizona, September 21, 1907 (Berl.; Gray; Kew; Mo., ubi *B. leptocephalae* adpropinquans; Mus. V.; U.S.); *idem* 2211, alt. 1,590 meters, Paradise, Arizona, October 3, 1907 (Gray; N.Y.); *F. E. & E. S. Clements* 64, alt. 2,200 meters, Engelmann Canyon, Colorado, August 24, 1901 (Berl.; Del., 2 sheets; Mo.; N.Y.); *C. S. Crandall* 2724, Ute Pass, Colorado, August 25, 1897 (Berl.; N.Y.; Par.); *W. W. Eggleston* 17416, alt. 1,500 meters, Fort Davis, Texas, September 19, 1920 (N.Y.; U.S.); *George Engelmann*, St. Louis, Missouri, May, 1848 (cult. e seminibus ad Santa Fe, New Mexico, lectis; Mo.); *J. G. Lemmon*, Apache Pass, Chiricahua Mts., Arizona, September, 1881 (Mo.; alibi est *B. leptocephala*); *idem* 2771, near

[1] The material at New York (from the old Torrey Herbarium) has the No. 582 and, additional to the Limpio locality and date, "Puerto de Paysano, Sept. 4, 1852."

BIDENS TENUISECTA Gray

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Fort Huachuca, southern Arizona (Gray); *idem & uxor*, Huachuca Mts., Arizona, September, 1882 (Kew); *O. B. Metcalfe* 839, on or near West Fork of Gila River, Mogollon Mts., Socorro Co., New Mexico, September 15, 1903 (U.S); *idem* 1096, moist loam, alt. about 1,980 meters, Kingston, New Mexico, July 9, 1904 (Berl.; Brit.; Del.; Field; Gray; Mo.); *Nealley* 244, Limpio Canyon, western Texas, 1889 (Field); *C. C. Parry*, Cibuta Valley, northern Sonora, Mexico, July, 1852 (Gray; N.Y.); *C. G. Pringle* 18, Huachuca Mts., Arizona, July 8, 1884 (Gray); *C. L. Shear* 4587, Manitou, Colorado, September 5, 1896 (N.Y.); *E. O. Wooton*, Organ Mts., Dona Ana Co., New Mexico, September 17, 1893 (N.Y.); *idem*, eodem loco, September 28, 1902 (U.S.); *idem*, Filmore Canyon, eodem loco, October 23, 1904 (U.S.); *idem*, Santa Rita Mts., Arizona, September 30, 1913 (U.S.); *idem* 430, alt. 1,440 meters, Organ Mts., New Mexico, September 1, 1897 (Berl.; Boiss.; Calif.; Del.; Kew; Par.; U.S.; U.V.); *idem & P. C. Standley*, alt. about 1,650 meters, eodem loco, September 23, 1906 (U.S.); *iidem*, alt. about 1,800 meters, eodem loco et tempore (U.S.); *Charles Wright* 346, western Texas, May–October, 1849 (Gray).

Bidens Bigelovii var. *β.* **pueblensis** Sherff, Bot. Gaz. 88: 287. 1929.

Folia principalia valde membranacea, tenuiter petiolata petiolis usque ad 3 cm. longis, petiolo adjecto 5–7 cm. longa, circumambitu triangulato-ovata, pinnata vel bipinnatisecta, segmentis primariis ovatis saepe 2–3 cm. longis et 1.2–1.6 cm. latis. Flores ligulati circ. 5, subflavi, circ. 6–7 mm. longi. Achaenia inferne glabrata superne plus minusve erecto-setosa, apice biaristata (vel exteriora interdum calva) aristis stramineis 1.5–3 mm. longis retrorsum hamosis, dimorpha, exteriora clavata badia vel rubro-straminea corpore tantum circ. 4.5–5.5 mm. longa, interiora atra corpore usque ad 11 mm. longa et superne attenuata.

Type specimen: Collected by *Fr. G. Arsène*, No. 7211, vicinity of Puebla, State of Puebla, Mexico, October, 1908 (U.S.).

Distribution: States of Michoacán, Mexico (with Federal District), Puebla, Oaxaca, and Chiapas, southern Mexico.

Specimens examined: *G. Arsène* 1982, Hacienda Batán, near Tatimehuacán, vicinity of Puebla, State of Puebla, December 3, 1907 (U.S.); *idem* 5870, alt. 1,950 meters, Loma Santa María, vicinity of Morelia, Michoacán, Mexico, September 4, 1910 (U.S.); *idem* 7211 (type, U.S.); *C. Conzatti* 2261, alt. 2,000 meters, Cerro

San Felipe, Distr. del Centro, Oaxaca, Mexico, October 18, 1908 (Field); *E. W. Nelson* 3167, alt. 2,100–2,400 meters, near San Cristóbal, Chiapas, September 18, 1895 (Gray); *F. Nicolás* 5557, Batán, State of Puebla, November 14, 1910 (U.S.); *C. G. Pringle* 6784, near Tlalpam, Valley of Mexico, Federal District, September 10, 1897 (Berl.; Boiss.; Del.; Gray; Mun.; Mus. V.).[1]

The foliage of the observed specimens suggests strongly that of *Bidens duranginensis* Sherff, but the dimorphic achenes reveal the affinity with *B. Bigelovii* Gray, a species which, in its typical form, is confined to a more northern range.

EXPLANATION OF PLATE LXXXIX, FIGS. *a–k*

Bidens Bigelovii: a, flowering and fruiting specimen, ×0.67; *b*, fruiting branch, ×0.67; *c*, exterior involucral bract, ×4.02; *d*, interior involucral bract, ×4.02; *e*, ray corolla, ×4.02; *f*, palea, ×4.02; *g*, disc floret, ×4.02; *h* and *j* (outer), *i* and *k* (inner), achenes, ×2.68; *a*, *c–i*, from type; *b*, *Parry* 882, in Hb. Gray; *j*, *k*, *Bigelow*, mountain arroyo, Rock Creek, Texas, July (A. Gray's unnamed variety), in Hb. Gray.

114. **Bidens leptocephala** Sherff, Bot. Gaz. 64: 22. 1917.
Pl. XC.

Herba annua, 1–5 dm. alta, ramosa; caule et ramis tetragonis, saepius glabratis, striatis, tenuibus. Folia petiolata petiolis 0.3–4 cm. longis sparsim hispido-ciliatis ad basim connatis, petiolo adjecto 2–10 cm. longa, 1.5–5.5 cm. lata, bipinnata (inferiora non saepe unipinnata), minute ciliata, hispida (praecipue ad venas) vel glabrata, segmentis nunc linearibus nunc etiam ovatis. Capitula terminalia, subradiata vel discoidea, pansa ad anthesin 3–5 mm. alta et 4–8 mm. lata, cum achaeniis 1–1.5 cm. alta et saepius 2–4 mm. lata, tenuissime pedunculata pedunculis 2–8 cm. longis. Involucrum basi subglabrum; bracteis exterioribus 4–6, linearibus, ciliatis, 1–2.5 mm. longis; interioribus dimidio longioribus, lanceolatis, glabris vel ad apicem pubescentibus. Flores ligulati (interdum deficientes) circ. 3, minimi (circ. 2.5 mm. longi et 1.2 mm. lati), integri vel ad apicem bidentes, 4- vel 5-striati, subalbidi. Achaenia pauca

[1] A form in the past confused by me with *B. duranginensis* and with *B. pilosa* var. *radiata*. Cf. O. E. Schulz in Urban, Symb. Antill. 7: 138. 1911: "Equidem hanc formam [*subbiternatam* O. Ktze.] in specimine unico a cl. *Pringle* (n. 6784) in Mexico collecto observavi;"–eundem, Engler Bot. Jahrb. 50, Suppl. 177. 1914: "Nur ein einziges Mal habe ich in dem reichhaltigen Material des Berliner Bot. Museums ein Exemplar gefunden, dessen unterste Fiederblättchen etwas geteilt sind (Mexico: *Pringle* n. 6784)."

BIDENS PAUPERCULA Sherff

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(5–9 vel interdum –13), subtetragona, linearia, biaristata aristis retrorsum hamosis, 1–3 mm. longis; quaedam exteriora badia vel subnigra, hispida, corpore 6–8 mm. longa; interiora nigra vel ad apicem helveola, infra glabra, supra hispida, corpore 0.9–1.4 cm. longa.

Type specimen: Collected by *J. C. Blumer*, No. 1712, in shade, sandy alluvium soil at altitude of 1,615 meters, near Cedar Gulch, Paradise, Chiricahua Mountains, Arizona, September 21, 1907 (Gray).

Distribution: State of Chihuahua (Mexico) northward into New Mexico and westward into Arizona and Lower (Baja) California.

Specimens examined: *J. M. Bigelow* (*Lt. A. W. Whipple's Expl.*), Hurrah Creek, northern Guadalupe Co., New Mexico, September 25, 1853–1854 (N.Y.); *idem* 581, "mountains near Estaban" (Gray; N.Y.); *Blumer* 1712 (type, Gray: cotypes, Berl.; Kew; Mo.; Mus. V.); *idem* 2144, alt. 1,680 meters, Wilgus Ranch, base of rhyolite slope, Chiricahua Mts., Arizona, September 4, 1907 (U.S.); *T. S. Brandegee*, San Bernardo, Lower California, October 13, 1893 (Calif.); *idem*, Miraflores, Lower California, September 27, 1899 (N.Y.); *idem* 320, mountains near Agua Caliente, Lower California, October 18, 1890 (Calif.); *E. L. Greene* 263, banks of the Upper Gila River, New Mexico, August 29, 1880 (Gray); *David Griffiths* 1985, Hudson Ranch, near Pierce, Arizona, October, 1900 (N.Y.); *idem* 5994, fenced area, Santa Rita Mts. Forest Reserve, Arizona, September 27–October 4, 1903 (U.S.); *idem* 6014, above range reserve, Santa Rita Mts., Arizona, September 12–October 18, 1903 (U.S.; forma foliis *Bidenti Bigelovii* adpropinquans); *Griffiths & Thornber* 65, Santa Rita Mts., Arizona, September 20–October 4, 1902 (U.S.); *M. E. Jones*, alt. 1,350 meters, Santa Rita Mts., Arizona, August 24, 1903 (Stanf.); *J. G. Lemmon*, Apache Pass, Fort Bowie, Chiricahua Mts., Arizona, September, 1881 (Brit.; Calif.; Carn.; Field; Par., 2 sheets; alibi, e.g. Mo., est *B. Bigelovii*); *idem* 333, near Fort Huachuca, southern Arizona, 1882 (Gray); *idem* 3029, eodem loco, 1883 (Gray); *idem & uxor*, Apache Pass, Fort Bowie, Chiricahua Mts., Arizona, September, 1881 (Brit.; Carn.; U.S.); *C. G. Pringle* 62, near Arivaca, Arizona, August 31, 1884 (Gray); *idem* 534, near Chihuahua, State of Chihuahua, Mexico, September 6, 1885 (Gray); *idem* 1574, shaded banks, Sierra Madre, Chihuahua, September 17, 1887 (Field; Mo.); *J. J. Thornber* 72, alt. 1,500 meters, Stone Cabin Canyon, Santa Rita Mts., Arizona, September 14, 1903 (Mo.; N.Y.); *George Thurber*, near Chihuahua, State of Chihuahua, Mexico, October, 1852 (Gray); *idem* 842, November (Gray); *C. H. T. Townsend & C. M. Barber* 411, alt. 2,100 meters, near Seven-star Mine, Sierra Madre, Chi-

huahua, September 7, 1899 (Brit.; Del.; Kew; Mo.; Par.); (*E. O. Wooton* 430, formerly referred in small part to this species, seems rather to be entirely *B. Bigelovii;*) *C. Wright* 1234*bis* pro parte, New Mexico, 1851–1852 (Kew; Mo.; Phila.).

EXPLANATION OF PLATE XC

Bidens leptocephala: a, entire fruiting plant, ×0.67; *b,* exterior involucral bract, ×6.7; *c,* interior involucral bract, ×6.7; *d,* ray floret, ×6.7; *e,* palea, ×6.7; *f,* disc floret, ×6.7; *g* (outer), *h* (inner), achenes, ×5.36; all mainly from cotype in Hb. U.S.

115. **Bidens bipinnata** L. Sp. Pl. 832. 1753.
Pl. LXXXIX, figs. *l–s.*

Bidens fervida Hort. ex Colla, Herb. Pedem. 3: 306. 1834.

Bidens Myrrhidifolia Tausch, Flora 19: 394. 1836.

Bidens Cicutaefolia Tausch, op. cit. 395.

Bidens elongata Tausch, loc. cit. (ex descript. etc.).

Bidens tenuifolia Tausch, loc. cit.

Bidens decomposita Wall. ex DC. Prodr. 5: 602. 1836.

Coreopsis Corymbifolia Ham. in Wall. ex DC. loc. cit.[1]

Bidens Kotschyi Schz. Bip. ex Walp. Repert. 6: 168. 1846.

Bidens Kotschyana Schz. Bip. loc. cit.

Kerneria bipinnata (L.) Godr. & Gren. Fl. Fr. 2: 169. 1850.

Bidens pilosa var. *bipinnata* (L.) Hook. Fl. Brit. Ind. 3: 309. 1881.

Bidens pilosa var. *decomposita* (Wall. ex DC.) J. D. Hook. loc. cit.

Bidens bipinnata var. *minor* Memm. Journ. Elisha Mitchell Sci. Soc. 30: 148. 1915.

Bidens pinnata L. ex Sherff, Bot. Gaz. 70: 94. 1920 (sphalm).[2]

Folia normaliter bipinnata; involucri bracteis exterioribus apicaliter acutis . . . . . *B. bipinnata* sensu stricto.

Folia pinnata vel tantum foliolis imis tripartitis bipinnata; involucri bracteis exterioribus superne dilatatis . . . . . var. *β. biternatoides.*

Herba annua, erecta, plerumque glabra sed rariter minute setoso-hispida, ramosa, caule tetragona, 3–12 (–17) dm. alta. Folia tenuiter

[1] Copies of Wallich's *Catalogue* seen by me give "*Coreopsis? corindifolia* Ham." (cf. Sherff, Bot. Gaz. 86: 442 and footnote 3. 1928), indicating a resemblance in foliage to *Corindum.*

[2] *Bidens fervida* Nocca (nomen in Fischer, Cat. Jard. Pl. Razoum. Gorenki ed. 2. 37. 1812) is represented by two specimens (Petrop.) and is seen to be purely *B. bipinnata* L. (cf. Sherff, Bot. Gaz. 86: 442. 1928).

BIDENS PRINGLEI Greenm. (figs. *a–h*)
BIDENS HETEROSPERMA Gray (figs. *i–o*)

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petiolata petiolis 2–5 cm. longis, petiolo adjecto 0.4–2 dm. longa, normaliter 2–3-pinnata, membranacea, ciliata, segmentis ultimis saepe deltoideo- (vel rhomboideo-) lanceolatis, basim versus cuneatis. Capitula florescentia parva, 5–7 mm. alta et 4–6 mm. lata, pedunculata pedunculis tenuibus et 1–10 cm. longis, obscure radiata. Involucrum ad basim pubescens, bracteis exterioribus 7–10, linearibus, ad apicem acutis, 3–5 mm. longis; interioribus lineari-lanceolatis, exteriores dimidio superantibus. Flores ligulati flavido-albidi, ligula lanceolati vel obovato-lanceolati, apice integri vel valde irregulariterque 2–3-lobulati, floribus tubulosis non longiores. Achaenia linearia, tetragona, (rarissime 2-) 3- vel 4-aristata aristis flavidis retrorsum hamosis plerumque 2–4 mm. longis; corpore plerumque nigro, supra attenuato et saepe setis parvis sparsim vestito, infra glabrato, 1–1.8 cm. longo; corpore 2–4 exteriorum saepe crassiore, rufulo, minute et creberrime tuberculato-hispido, 0.7–1.2 cm. longo.

Type specimen: No type was cited. The habitat was given as Virginia and the first pre-Linnean reference given for a synonym (Chrysanthemum aquaticum, foliis multifidis cicutae nonnihil similibus, virginianum. Herm. lugdb. 416. 1690) relates definitely to a Virginia plant.[1] The nativity of the specimen in the Linnean Herbarium is not indicated on the sheet.

Distribution: Rhode Island to Florida and westward to Kansas and Mexico; rare in California; scattered in French Guiana, Brazil, Argentina, Chile, etc.; common in northern Italy and the Tyrol and extending into France; also in British East India, China, Corea, Japan, Kordofan, islands of Madagascar and Sokotra (east coast of Africa), Lizard Island (northeast coast of Australia), Philippine Islands, etc. Probably native in recent times only to the eastern United States and eastern Asia, elsewhere introduced.[2]

Specimens examined: *Ambrosius*, in vineyards, Valsugana, Italy (Del.); *anon.* (Linn., sub num. 6 et nom. *bipinnata*); *anon.* 63, Lizard Isl., northeast coast of Australia, April, 1861 (Mus. V., 2

[1] In early days the boundaries of Virginia extended much farther west, of course, than at present. It may be added that in the later (posthumous) work of Hermann's, his *Paradisus Batavus* (*pl. 123*. 1698), a crude illustration of an entire plant was given, accompanied by the slightly modified name *Chrysanthemum Virginianum foliis Cicutae nonnihil Similibus*. The plate was positively of our Linnean *B. bipinnata*.

[2] Other authors have commonly regarded this species as native to the United States, whence introduced elsewhere. The characteristic and quite individual aspect found in much of the Asiatic material, an aspect that has persisted through specimens collected many years apart (and has occasioned the employment of separate specific names), leaves no doubt, however, that eastern Asia has been a home to this species since prehistoric times.

sheets); *A. Autheman* 2217, Martiques, Dept. Bouches du Rhône, France, September, 1889 (Berl.; Boiss.; Del.; Mus. V.); *C. F. Baker* 8, Auburn, Alabama, September 20, 1896 (N.Y.); *R. Baron* 99, Madagascar (Kew); *H. C. Benke* 236, Hutchinson, Kansas, October 5, 1918 (Field); *Biroli*, ex herb. of (sub nom. *B. fervida* Hort. Erfurt. in herb. Collae, Tur., 2 sheets); *F. Bracht*, sterile fields, Verona, Italy (Mun.; Mus. V.); *T. S. Brandegee*, Sierra de la Laguna, Lower California, Mexico, October 4, 1899 (Calif.; N.Y.); *J. R. Churchill*, Bay-Head, Barnegat Bay, New Jersey, August 24, 1892 (Gray); *A. H. Curtiss*, Bedford Co., Virginia, September, 1867 (Can.); *idem* 1499, dry, fertile soil, near Jacksonville, etc., Florida, September (Berl., 2 sheets; Boiss.; Brit.; Carn.); *idem* 4490, near Jacksonville, Florida, October 11, 1893 (N.Y.); *idem* 5221, eodem loco, October 1, 1894 (Mus. V.; N.Y.); *idem* 6013, cultivated ground, eodem loco, October 5, 1897 (Del., 2 sheets; Gray; Kew; U.V.); *Bretschneider* 385 and 386, Peking, Prov. Chi-li, China (Kew); *idem* 387, eodem loco (Berl.); *John Bright*, Glenshaw, Pennsylvania, September 5, 1912 (Carn.); *J. B. Brinton*, Wawa, Pennsylvania, August 29, 1888 (Penn.); *S. W. Bushell*, near Peking, Prov. Chi-li, China (Kew); *W. M. Canby*, "everywhere," Wilmington, Delaware (Can.); *C. B. Clark* 22115*A*, alt. 1,800 meters, Dalhousie, Kashmir, British East India, September 10, 1874 (Brit.); *Lady Dalhousie*, alt. 2,250 meters, Simla, Himalayan region, British East India, September 3, 1831 (Kew); *John Davis* 8, New Albany, Indiana, September 15, 1909 (Mo.; forma fructibus ±arcuatis *B. Cynapiifoliae* adpropinquans); *C. Dawson* 382, Valparaiso, Chile (Kew); *De Sardagna*, Trent, Tyrol (U.V.); *L. H. Dewey* 523, neglected lawn, Mt. Pleasant, District of Columbia, September 2, 1901 (Can.; Gray; Phila.); *T. Drummond*, St. Louis, Missouri, 1832 (Kew); *idem* 192, eodem loco (Kew); *G. A. Eifrick*, Cumberland, Maryland, August (Carn.); *Adolph Engler*, above Mori (Tyrol) at foot of Monte Baldo, Italy, July, 1870 (Berl.); *P. Eugene*, Drome, France, June, 1871 (U.V.); *F. Evrard* 154, road from Saigon, mangrove 10 km. from the Cape, French Indo-China, October 21, 1820 (Calif.); *D. Facchini* 2040, Bozen (Botzen) and Roveredo and above Mori at Lake Garda, Tyrol (Berl.; Carn.; Gray; Mus. V.; Par.); *Urbain Faurie* 768, central Corea, September 4, 1901 (Berl.); *idem* 1053, fields, Seoul, Corea, September, 1906 (Brit.); *Andrea Fiori* 382, alt. 23 meters, about Lake Superior, Mantua (Mantova), Italy, September 20, 1904 (Gray; Kew; U.V.); *A. Fredholm* 5991, waste ground, Okeechobee region, Brevard Co., Florida, September 9, 1903 (Gray); *C. A. Geyer* 47 and 529, Cahokia

River, vicinity of East St. Louis, Illinois, September, 1841 (Mus. V.); *H. A. Gleason* 814, rich woods, Windsor, Illinois, August 30, 1899 (Gray); *Asa Gray*, Florida (Del., 2 sheets); *J. M. Greenman* 250, bank of Blackwater River, Hendricks, West Virginia, September 10, 1904 (Field); *G. Guttenberg*, vicinity of Wheeling, West Virginia, September, 1878 (Carn.); *Halsted* 35, New Brunswick, New Jersey, June, 1891 (N.Y.); *A. A. Heller*, Conestoga River, Lancaster Co., Pennsylvania, September 6, 1901 (Del.); *J. M. Hildebrandt* 3380*a*, among grass, Ambohitsi, Amber Mts., northern Madagascar, March, 1880 (Berl., 2 sheets; Kew; Mus. V.); *A. S. Hitchcock* 736, open ground, Allen Co., Kansas, 1896 (Gray; Mo.; U.V.); *Holz*, Pittsburgh, Pennsylvania, 1831 (Mus. V.); *J. D. Hooker & T. Thomson*, Khasia, British East India (Gray); ex *Hort. Cliffortiano* (Brit.); *H. D. House* 4003, alt. 1,200 meters, Pisgah Forest, Looking-glass Mountain, North Carolina, September 3, 1908 (Gray); *M. E. Hyams*, Statesville, North Carolina (Carn.); *J. F. Joor*, Lafourche Parish, Louisiana, September 19, 1872 (Field); *H. D. Keeler*, vicinity of Mayport and Jacksonville, Florida, 1870–1876 (Carn.); *Kerner*, abundant at Mori, Tyrol (U.V.); *idem*, Bozen (Botzen), Tyrol (U.V.); *Koch*, ditches near Bozen, Tyrol, 1828 (Del.); *Kotschy* 79, at eastern foot of Mt. Arasch-Cool, Kordofan, September 30, 1839 (type collection of *Bidens Kotschyi* Schz. Bip. ex Walp.; Berl., 2 sheets; Del., 3 sheets; Mo.; Mun., 2 sheets; Mus. V.; Par.; U.V.); *idem* 91, eodem loco, August, 1837 (Kew, 2 sheets; Mus. V.); *A. B. Langlois*, along fences in rich soil, Plaquemines Parish, Louisiana, July, 1882 (Barn.); *Leblond* 330, French Guiana, 1792 (Del.); *Lindheimer*, Houston, Texas, October, 1842 (Gray; Kew); *C. D. Lippencott*, *Swedesboro*, New Jersey, September 10, 1892 (Phila.); *J. C. Liu* 1306, Prov. Chi-li, China, August 27, 1927 (Calif.); *idem* 1349, Wofossu, Western Hills, Prov. Chi-li, August 30, 1927 (Calif.; nom. Sinorum, Kui Chen Ts'ao); *F. E. Lloyd* 162, flats, Hacienda de Cedro, Zacatecas, Mexico, 1908 (U.S.); *idem & S. M. Tracy* 542, Biloxi, Mississippi, September 5, 1900 (N.Y.); *Bayard Long* 6912, Westville, New Jersey, September 22, 1911 (Phila.); *Alexander MacElwee* 1902, damp, shaded places near Overbrook, Pennsylvania, September 3, 1900 (Carn.); *J. M. Macfarlane*, Holly Beach, New Jersey, September 12, 1907 (Penn.); *E. E. Maire*, gardens, alt. 2,500 meters, plain of Tongtchouan (Tong-tschwan), Prov. Yun-nan, China, September, 1912 (Del.; forma *B. biternatae* var. *glabratae* adpropinquans); *B. Matthes* 295, Kentucky (Mus. V.); *G. O. A. Malme* 1456*a*, Quinta near Rio Grande, Rio Grande do Sul, Brazil, April 4, 1902 (Stockh.); *W. R.*

Maxon 5966, moist bank by canal, near Cabin John, Maryland, October 10, 1912 (U.S.); *Marie Meislahn* 69, Clarcona, Florida, September 25, 1899 (U.S.); *E. D. Merrill* 4308, Bued River, Prov. Benguet, Luzon, Philippine Isls., October–November, 1905 (Berl.); *H. N. Mertz*, Brooke Co., West Virginia, September 27, 1879 (Carn.); *C. F. Millspaugh* 791, Deckers Creek, Monongalia Co., West Virginia, September 8, 1890 (N.Y.); *C. J. Moser*, Pennsylvania, August, 1832 (Mus. V.); *G. V. Nash* 2495, Lake City, Florida, August 29–31, 1895 (Berl.; Del.; Field; Kew; Petrop.; U.V.); *Noë*, Fiume, Italy (U.V.); *Pailane* 558, Cape St. Jacques, Cochin China, October 17, 1919 (Del.); *Edward Palmer* 782, the market, Zacatecas, State of Zacatecas, Mexico, 1898 (Gray); *R. Pampanini*, Conegliano, Venetia, Italy, September, 1903 (Flor.); *A. S. Pease* 8645, waste ground, alt. 275 meters, Bozen (Botzen), Tyrol, November 7, 1905 (Gray); *Charles Pickering*, near Bombay, India, 1844–1845 (Phila.; forma *Bidenti biternatae* adpropinquans); *Eduard Poeppig*, wet places, Tuscarora Mt., Pennsylvania, September, 1824 (Del., 2 sheets; Mus. V., 3 sheets); *C. L. Pollard* 688, Rock Creek, vicinity of Washington, District of Columbia, September 15, 1895 (U.S.); *T. C. Porter*, Easton, Pennsylvania, October 3, 1887 (Field); *G. N. Potanin*, northern part of Prov. Szetschuan (Sze-chuan), China, July 14, 1885 (Berl.); *idem*, valley of River Toiho below Yhepu, Prov. Szetschuan, July 17, 1885 (N.Y.); *idem*, near Naitiha, Prov. Szetschuan, September 11, 1885 (Mus. V.); (*C. G. Pringle* 534, from near Chihuahua, September 6, 1885, was formerly referred to this species but is now seen to be *B. leptocephala;*) *Rafinesque*, Cumberland Mts., Tennessee, etc., 1823 (Del., sub nom. *Bidente bipinnatifida*); *J. Reverchon* 2075, shaded ground, Dallas, Texas, September 13, 1900 (U.S.);[1] *P. H. Rolfs* 335, cultivated grounds, Lake City, Florida, September 14, 1894 (Field); *F. Rugel*, in ruderal places near Portsmouth, Virginia, September, 1840 (Del.; Mus. V.); *idem*, valley at Broad River, North Carolina, July, 1841 (Del.); *idem* 257, Florida, 1845 (Gray; U.S.); *A. Ruth*, damp soil, Knoxville, Tennessee, August, 1895 (Field); *idem* 600, rich woods, eodem loco, September, 1898 (N.Y.); *P. A. Rydberg* 8212, Roan Mt. Station, Tennessee, August 28, 1908 (N.Y.); *Matth. Schreiber*, St. Anton, near Bozen, Tyrol, September 20, 1909 (Mus. V.); *idem* 5091, banks of Talfer Brook, Gries near Bozen, Tyrol, September, 1908 (Berl.; Del., 2 sheets; Mun.; Mus. V.; Par.; U.V., 2 sheets); *J. A. Shafer*, Pittsburgh, Pennsylvania,

[1] Here may be noted *F. A. Rogers* 25123, alt. 1,500 meters, Premier Mine, Pretoria, Transvaal (Kew), a form intermediate between *B. bipinnata* and *B. biternata* and possibly a hybrid.

BIDENS EXIGUA Sherff (figs. *a–i*)
BIDENS DURANGINENSIS Sherff (figs. *j–q*)

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August 16, 1885 (Carn.); *C. W. Short* 50, banks of Ohio River, Fernbank, Ohio (Mus. V., 2 sheets); *O. Simony*, edge of marshy brook, plain of Kalansije, Sokotra, January 14, 1899 (Mus. V.); *P. Sintenis* 1390, Peri at foot of Mt. Baldo, Italy, October 4, 1881 (Berl.; Del.; Gray; Mun.; Mus. V.; Par.); *J. K. Small*, northeastern West Virginia, August 22, 1890 (Field); *idem*, alt. 630 meters, vicinity of Marion, Virginia, July 22–August 2, 1892 (Field); *Louise M. Stabler*, Port Chester, New York, August 25, 1887 (Gray); *P. C. Standley* 5373, alt. 900–1,500 meters, near Waynesville, North Carolina, August 31, 1910 (U.S.); *idem* 8514, vicinity of Springfield, Missouri, August 31, 1911 (U.S.); *idem* 8771, shaded bluffs, vicinity of Turner, Missouri, September 4, 1911 (U.S.); *E. S. Steele*, roadsides etc., vicinity of Washington, District of Columbia, September 2, 1896 (Del.; U.V., 2 sheets); *G. W. Stevens* 2249, Neoslio River near Miami, Oklahoma, August 24, 1913 (Del.); *Stolitzka*, alt. 1,200–3,000 meters, Prov. Kulu, Himalaya, India, September 7–20, 1864 (Mus. V.); *idem*, India, 1866 (Mus. V.); *R. Strachey & J. E. Winterbottom* 1, Mohaigari, Kumaon, Himalaya, India, 1848 (Kew); *Tausch*, cult. in garden (Lps., 2 sheets, sub nominibus *Bidente Cicutaefolia* Tausch et *Bidente Myrrhidifolia* Tausch); *C. W. Swan*, Lowell, Massachusetts, September 16, 1880 (N. Eng.); *C. H. Thompson*, French Village, Illinois, September 23, 1913 (Mo., forma capitulis gracilioribus, achaeniis paucioribus); *Diomède Tuezkiewicz*, vineyards at Le Vigan, France, August–September, 1859 (Mus. V.); *Tweedie*, Buenos Aires, Argentina (Kew); Wallich 298*a*, Nepal, India (type of *Bidens decomposita* Wall. ex DC., Del.); *idem* 3188*A*, eodem loco (Brit.); *C. Von Hepperger*, Bozen (Botzen), Tyrol, 1860 (Gray); *idem*, eodem loco, September, 1864 (Mus. V.); *Von Kellner*, Verona, Italy (Mus. V.); *J. Von Sterneck*, Peschiera on Lake Garda, Italy, 1893 (Cop.); *Warburg* 7844, vicinity of Yokohama, Japan, November, 1887 (Berl.); *Rosa B. Watson*, Atlanta, Georgia, November, 1881 (Gray); *P. J. White* 25, Dewey Co., Oklahoma, July 17, 1900 (Mo.); *H. N. Whitford* 12, waste places, Cold Spring Harbor, Long Isl., New York, August, 1903 (Field); *E. W. Williams*, railroad embankment, Dedham, Massachusetts, October 2, 1898 (Gray); *T. W. Williams*, Peking, Prov. Chi-li, China, August, 1876 (Gray); *idem* 298, on hills, Peking, August, 1865 (Kew; forma *B. biternatae* adpropinquans); *Percy Wilson*, vicinity of New York, New York, September 28, 1899 (N.Y.); *E. O. Wooton*, Mesilla Valley, Dona Ana Co., New Mexico, October, 1895 (U.S., 2 sheets); *Charles Wright* 1234, New Mexico, 1851 (Gray); *E. C. Wurzlow*, damp, sandy soil,

ditch bank in meadow, west of Houma, Louisiana, August 29, 1913 (N.Y.).

Tausch (loc. cit.) had sought to distinguish among five forms cultivated in gardens under the name *B. bipinnata.* He described each form separately, retaining one as *B. bipinnata* and creating new names for the other four. *B. Cicutaefolia* Tausch and *B. Myrrhidifolia* Tausch each is represented by one of his own cultivated specimens (Lps.) and is seen to be purely *B. bipinnata* (vide sub *B. biternata*). The meager description of *B. tenuifolia* Tausch matches *B. bipinnata* as far as it goes. A plate cited by Tausch, "Chrysanthemum cannabinum etc. Moris. Hist. 3^{VI}: tab. 7, fig. 23," is of *B. bipinnata* and is so treated by DeCandolle (Prodr. 5: 603. 1836) and O. E. Schulz (Bot. Jahrb. 50, Suppl.: 183. 1914). At Leipsic I failed to find an authentic specimen of *B. tenuifolia. B. elongata* Tausch appears likewise unrepresented by an authentic specimen to-day, but the description given by Tausch, as also his context, leaves no doubt as to the identity of *B. elongata* with *B. bipinnata.* The various specimens examined of *Kotschy* 79, the basis of *Bidens Kotschyi,* show mostly a variant of *B. bipinnata* in the direction of *B. biternata* var. *glabrata;* indeed, that at Kew (not the type) is very clearly *B. biternata* var. *glabrata.*

J. D. Hooker (loc. cit.) reduced *B. bipinnata* to varietal rank under *B. pilosa,* a treatment not generally accepted by botanists since then. True it is that Trimens (Fl. Ceyl. 3: 41. 1895) and also Th. Cooke (Fl. Bombay Pres. 2: 44. 1904) regarded Hooker's "variety" as "scarcely worth distinction" from *B. pilosa.* But this was before the researches of O. E. Schulz had placed *B. pilosa, B. biternata,* and *B. bipinnata* upon a firm footing as to definite fruiting and foliage characters.[1]

Of *Bidens bipinnata* var. *minor* Memm. I have seen no authentic material. Memminger's description ("Very delicate, small, 10 cm. high, in dense shade on rocks"), however, leaves little doubt that

[1] Cooke expressly cited Trimens' conclusion, agreeing with it. Trimens, in turn, doubtless was influenced by Hooker's grouping of *B. bipinnata* under *B. pilosa.* In view of the superficially intermediate leaves of *B. biternata* (B. *Wallichii*), a species very common in British East India, but erroneously equated by Hooker with *B. bipinnata,* it was only natural that Trimens should have felt that *B. bipinnata* equaled *B. pilosa.* Had he studied the fruiting characters as did O. E. Schulz later, he would have concluded otherwise. Curiously enough, Hooker, in publishing his work, relied here upon the erroneous treatment by C. B. Clarke (Comp. Ind. 141), as stated elsewhere (vide sub *B. biternata*). Clarke, at a later date, realized his own error and stated (on herb. label for *H. Collett* 816, Kew) that "*B. Wallichii* DC. [i.e. *B. biternata* (Lour.) Merr. & Sherff] has the ray yellow (and smaller) as well as different leaves and is a good species. C. B. Clarke. May 1894."

BIDENS PARVIFLORA Willd. (figs. *a–g*)
BIDENS LEMMONII Gray (figs. *h–n*)

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the name was applied to plants that were mere temporary dwarfs because of conditions of the habitat.

Bidens bipinnata var. *β.* **biternatoides** Sherff, Bot. Gaz. 90: 397. 1930.

Folia pinnata foliolis lateralibus 3–4-jugis, imis tripartitis segmentis lanceolatis ceteris simplicibus lanceolatisque. Capitula discoidea vel subradiata. Involucri bracteae exteriores superne sensim vel interdum fere subabrupte dilatatae. Achaenia 2-aristata.

Type specimen: Collected by *Elmer Ottis Wooton*, at altitude of 1,170 meters, in cultivated land, Las Cruces, New Mexico, October, 1895 (N.Y.).

Distribution: New Mexico and western Texas.

Specimens examined: *Wooton*, Las Cruces, New Mexico (type, N.Y.); *Charles Wright* 345, western Texas, 1849 (Del.).

In its slightly dilated outer involucral bracts this variety makes an approach toward *Bidens pilosa* L. The general aspect of the plant is at once that of the South American *B. subalternans* DC. and of the Old World *B. biternata* (Lour.) Merr. & Sherff, from both of which it differs sharply in its achenes.

EXPLANATION OF PLATE LXXXIX, FIGS. *l–s*

Bidens bipinnata: l, fruiting specimen, ×0.67; *m*, exterior involucral bract, ×4.02; *n*, interior involucral bract, ×4.02; *o*, ray corolla, ×4.02; *p*, palea, ×4.02; *q*, disc floret, ×4.02; *r* (outer), *s* (inner), achenes. ×2.68; all from *Curtiss* 1499, in Hb. Field.

116. **Bidens cylindrica** Sherff, Bot. Gaz. 81: 28. 1926. Pl. XCI, figs. *g–l*.

Bidens pilosa var. *pauciflora* O. E. Schulz, Bot. Jahrb. 50, Suppl. 186. 1914 (nomen).

Herba gracilis, erecta, 4–7 dm. alta; caule tetragono, glabro, ramoso, circ. 2–3 mm. diametro. Folia petiolata petiolis tenuibus 1–5 cm. longis, petiolo adjecto principalia 5–13 cm. longa, pinnatim 3–5-partita foliolis lanceolatis vel lateralibus ovatis, membranacea, serrata dentibus acriter apiculatis, margine ciliata, faciebus glabrata vel sparsissime adpresso-pilosa. Capitula ramos tenues plerumque nudos usque ad 13 cm. longos terminantia, plerumque subradiata, ad anthesin 4–5 (rarius –10) mm. alta et 3.5–4.5 (rarius –7) mm. lata, saepe cylindrica. Involucri bracteae exteriores 6–8, lineares, apicem versus saepius angustatae, apice acutae, margine piloso-ciliatae,

faciebus glabrae vel sparsim hispidae, 3–8 mm. longae et 0.3–1 mm. latae; interiores lanceolatae, apice subacutae, paulo vel interdum multo longiores. Flores ligulati rudimentarii, albidi vel rosaceo-albidi, oblongo-obovati, apice subtruncati et circ. 3-dentati. Achaenia 6–12, linearia, tetragona, atra, glabra vel exteriora saepe hispida, corpore 1.2–1.6 mm. longa et 0.5–0.8 mm. lata, bi- vel triaristata aristis moderate tenuibus retrorsum hamosis 2.5–4 mm. longis.

Type specimen: Collected by *Menyhart*, No. 1110, not abundant, in shady places at St. Joseph, Boruma (Mburuma; Boroma; about 400–500 kilometers above Tete on Zambesi River), Northern Rhodesia, April, 1892 (U.V.).

Distribution: From Boruma, Northern Rhodesia, southwestward up the Zambesi River to the District of Sebungwe (Sebungu), Southern Rhodesia; also north-northwestward to the Tschari (Schari, Shari, Chari) River, Tschad (Tchad, Chad) Lake region, some 3,000 kilometers distant.

Specimens examined: *Aug. Chevalier* 2816, along the Tschari River, Tschad Lake region, Sudan, October 26, 1899 (Berl.); *F. Eyles* (cult. e seminibus ab *R. W. Jackio* lectis, alt. 750 meters, Distr. Sebungwe, Southern Rhodesia, November, 1920; Kew); ex *Hort. Vindobon.* (cult. e seminibus *Menyhartii* numeri 1110; U.V., 2 sheets); *Menyhart* 1110 (type, U.V.); *Walter Robyns* 2004, alt. 930 meters, border of sandy beach of Lake Moero, Pweto, Belgian Congo, April 18, 1926 (Bruss.; nom. indig., Kasokopia).

The Chevalier specimen listed had been determined by O. E. Schulz as his *Bidens Engleri*, and in fact was cited by him, as was also the nomen *B. pilosa* var. *pauciflora*, for that species at the time of his original description (Bot. Jahrb. 50, Suppl.: 186. 1914). Recently, I have been privileged to study not only Schulz's type of *B. Engleri* (Berl.), but also excellent specimens of duplicate material (Boiss.; Mus. V., etc.). These all agree in having plants of low stature (2–3 dm. high), the leaves practically all undivided, the heads discoid; the exterior involucral bracts only about 3 or 4, spatulate, serrulate-ciliate, 1–2 mm. long; the inner bracts 2–5 times as long, often rounded at apex; the achenes all glabrous, parallel-sided through most of their length and thus *oblong*-linear, obcompressed, about 1 mm. wide. With this material the Chevalier and Menyhart specimens were compared and were seen to differ sharply as follows: Height, 4–7 dm., leaves 3–5-parted, heads subradiate; the exterior involucral bracts 6–8, linear and mostly narrowed above, ciliate with slender hairs instead of with minute serrulations, 3–8

BIDENS CAPILLIFOLIA Sherff

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mm. long; the inner bracts mainly 1.1–2 times as long, subacute at apex; the outer achenes frequently hairy, all narrower and gradually attenuate upward, distinctly tetragonal, only 0.5–0.8 mm. wide.

A question at once arose from the fact that the Chevalier and Menyhart specimens had come from localities 3,000 km. or more apart, while the type material of *B. Engleri* had come from a point more or less intermediate (about 6°–8° N. Lat. and 26°–28° E. Long. In my judgment morphological considerations outweighed those as to geographical distribution and appeared to compel a segregation of the Chevalier and Menyhart (and, when later found, the Eyles and Robyns) specimens as a species distinct from *B. Engleri*.

The name *cylindrica* alludes to the shape of the flowering heads which, in the two specimens cultivated from achenes of *Menyhart* 1110, are notably cylindric.

EXPLANATION OF PLATE XCI, FIGS. *g–l*

Bidens cylindrica: g, cauline leaf, ×0.6; *h*, subflowering head, ×2.4; *i*, exterior involucral bract, ×2.4; *j*, interior involucral bract, ×2.4; *k*, ray corolla, ×2.4; *l*, achene, ×2.4; *g, i, j*, from 1st type sheet; *h, k*, from 2nd type sheet; *l*, from *Chevalier* 2816, in Hb. Berl.

117. **Bidens cornuta** Sherff, Bot. Gaz. 64: 22. 1917.
Pl. XCII, figs. *h–n*.

Herba annua, 3–5 dm. alta; caule et ramis tetragonis, striatis, glabris, tenuibus. Folia petiolata petiolis 0.3–3 cm. longis et supra basim hispidam glabris, petiolo adjecto 3–12 cm. longa et 3–6 cm. lata, pinnata (vel summa bipinnata), ciliata, supra subglabra, infra sparsim adpresso-hispida; foliolis vel dentatis vel incisis vel etiam (imis foliorum superiorum) distincte partitis, circumambitu ovatis vel lanceolatis. Capitula terminalia, discoidea (vel interdum subligulata?), tenuiter pedunculata pedunculis 2–9 cm. longis. Involucrum basi glabrum; bracteis exterioribus 5–8, linearibus, glabris vel infra hispido-ciliatis, 2–3 mm. longis; interioribus late linearibus, glabris, 4–5 mm. longis. Achaenia anguste linearia, striata, triaristata; aristis maturis 5–7 mm. longis et divaricatis, supra tenuissime et retrorsum hamosis, demum plus minusve deciduis; nonnulla exteriora achaenia subbadia, hispida, corpore 6–10 mm. longa; interiora elongato-attenuata, nigra vel subnigra vel ad apicem subflavida, infra glabra, supra hispida, corpore 1.3–2 cm. longa.

Type specimen: Collected by *Edward Palmer*, No. 131, at altitude of 730 meters, Hacienda San Miguel, southwestern Chihuahua, Mexico, August, 1885 (Gray).

Distribution: Known only from type locality in southwestern Chihuahua, Mexico.

Specimens examined: *Palmer* 131 (type, Gray: cotypes, Brit.; Kew; N.Y.; Phila.).

EXPLANATION OF PLATE XCII, FIGS. *h–n*

Bidens cornuta: h, flowering and fruiting spray, ×0.57; *i*, exterior involucral bract, ×3.44; *j*, interior involucral bract, ×3.44; *k*, palea, ×3.44; *l*, disc floret, ×3.44; *m* (outer), *n* (inner), achenes, ×3.44; *h*, from cotypes in Hb. Phila. and Hb. U.S. (mainly from middle specimen on sheet in latter herb.); *i–n*, from type.

118. **Bidens tenuisecta** Gray, Pl. Fendler. 86. 1849.
Pl. XCIII.

Bidens cognata Greene, Leafl. Bot. Crit. 1: 149. 1905.

Herba erecta, annua, glabra vel sparsim hirsuta, infra plerumque simplex, supra ramosa, 0.2–1.5 m. alta; caule tetragono, viridi purpurascentive. Folia petiolata (vel summa sessilia) petiolis 0.5–3.5 cm. longis, petiolo adjecto 0.5–1.4 dm. longa, pinnata vel saepius 2–3-pinnata segmentis anguste linearibus 0.5–2.5 mm. latis. Capitula inconspicue radiata, ad anthesin 4–10 mm. lata et 6–10 mm. alta. Involucrum inferne plerumque hirsutum; bracteis linearibus et subaequalibus, exterioribus 6–12, 5–7 mm. longis. Flores ligulati flavi, ligula obovati vel lanceolati, apice saepe denticulati, tantum 4–6 mm. longi. Achaenia linearia, tetragona; interiora maxima ex parte nigra, glabrata vel saepius apicem versus erecto-setosa, supra attenuata, apice plerumque flava, corpore 8–15 mm. longa, biaristata vel rarissime triaristata aristis retrorsum hamosis, plerumque flavis, 1.5–3 mm. longis; pauca exteriora breviora, crassiora, saepe badia, glabrata vel interdum papillato-hispida, corpore 6–8 mm. longa, apice biaristata aristis retrorsum hamosis et 1–3 mm. longis.

Type specimen: Collected by *August Fendler*, No. 449, margins of Poñil Creek, between Bent's Fort, Colorado, and Santa Fe, New Mexico, in 1847 (Gray).

Distribution: Southeastern Idaho southward through Colorado, New Mexico, and Arizona into the State of Chihuahua, Mexico; reported as adventive near Rochester, New York (N.Y. State Mus. Bull. 139:19. 1910).

Specimens examined: *C. F. Baker* 643, Chama, New Mexico, September 6, 1899 (Berl.; Boiss.; Del.; Gray; Kew); *E. A. Bessey*,

BIDENS BITERNATA (Lour.) Merrill & Sherff (figs. *a*, *c–m*)
BIDENS PILOSA L. (fig. *b*)

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alt. 1,800 meters, Colorado Springs, Colorado, July 10, 1895 (N.Y.); *J. M. Bigelow*, banks of the Pecos River, New Mexico–Texas, October 14, 1853 (U.S.); *J. C. Blumer* 1386, alt. 2,400–2,475 meters, Barfoot Park, Chiricahua Mts., Arizona, September 17, 1906 (Field; Gray; Kew; Mus. V.); *idem* 1593, eodem loco, August 22, 1907 (Berl.; Field; Kew; Mus. V.); *idem* 2056, alt. 2,250 meters, Grand View, above Paradise, Chiricahua Mts., Arizona, September 10, 1907 (Field); *T. S. Brandegee*, New Mexico, 1879 (Calif.); *idem* 1164, Animas Valley, Colorado, 1875 (Calif.); *F. E. & E. S. Clements* 65, alt. 2,100 meters, Engelmann Canyon, Colorado, September 7, 1901 (Berl.; Del.; Gray); *I. W. Clokey* 3948, alt. 2,270 meters, dry hillsides, Cascade, Colorado, August 29, 1920 (Cop.; Field; Mo.; Phila.); *idem* 4368, alt. 2,040 meters, dry hills, Rye, Colorado, September 3, 1921 (Cop.; Phila.); *J. H. Cowen* 2726, Palmer Lake, Colorado, September 10, 1897 (N.Y.; Par.); *C. S. Crandall* 2725, alt. 2,400 meters, Buena Vista, Colorado, August 19, 1897 (Field); *Alice Eastwood* 28, along Platte River, Denver, Colorado, August 10, 1910 (Gray; Kew); *W. W. Eggleston* 10728, alt. 1,600 meters, Portal, Chiricahua National Forest, Arizona, September, 1914 (U.S.); *idem* 10873, alt. 2,200 meters, Barfoot Fire-station to Paradise, Chiricahua National Forest, Arizona, September 23, 1914 (Gray; U.S.); *idem* 15012, alt. 2,140 meters, Salida, Colorado (U.S.); *Charlotte C. Ellis* 261, gardens, Balsam Park, Sandia Mts., New Mexico, July 10 (N.Y.); *eadem* 280, alt. 2,460 meters, in fields, Balsam Park, August 4, 1914 (N.Y.); *A. Fendler* 449, New Mexico (type, Gray: cotypes, Berl., 2 sheets; Boiss.; Brit.; Flor.; Kew, 2 sheets; N.Y.); *E. L. Greene*, Cucharas River, Huerfano Co., Colorado, September 5, 1873 (Field); *idem*, Fort of Colorado, September 3, 1873 (Gray); *idem* 456, Pinos Altos Mts., New Mexico, September 14, 1880 (Gray; Kew; Phila.; U.V.); *M. E. Jones*, alt. 2,100 meters, Mound Valley, Sierra Madre, Chihuahua, Mexico, September 18, 1903 (Mo.; U.S.); *idem* 803, alt. 1,800 meters, Cheyenne Canyon, Colorado, October 5, 1878 (Berl.; Brit.); *J. G. Lemmon* 2768, near Fort Huachuca, Arizona, 1882 (Gray); *idem* 2907, eodem loco et tempore (Gray); *idem & uxor*, Chiricahua Mts., Arizona, September, 1881 (Brit.; Calif.; Kew; U.S.); *O. B. Metcalfe* 546, alt. about 2,550 meters, Mogollon Mts., Socorro Co., New Mexico, August 19, 1903 (Brit.; Del.; Gray; Kew); *idem* 1436, among pines, alt. about 2,850 meters, Sawyer's Peak, Grant Co., New Mexico, September 30, 1904 (cotypes of *B. cognata* Greene; Berl.; Brit.; Del.; Field); *A. Isabel Mulford*, Pocatello, Idaho, August 25, 1892 (N.Y.); *idem* 1232, Whitman's

Camp, New Mexico, September 8, 1895 (Kew; N.Y.); *E. W. Nelson* 4938, State of Chihuahua, Mexico, September 8, 1898 (Field); *C. C. Parry* 115, Fort Garland, northern New Mexico, September, 1867 (Berl., 2 sheets; Gray); *idem* 605, southern Colorado, 1867 (U.S.); *Eugène Penard* 211, alt. 1,800 meters, Colorado Springs, Colorado, September, 1891 (Boiss.); *C. G. Pringle* 1287, canyons, Sierra Madre, Chihuahua, Mexico, September 23, 1887 (Boiss.; Field; Kew; Phila.; U.V.); *idem* 1636, base of Sierra Madre, Chihuahua, Mexico, October 8, 1888 (Berl.; Brit.; Del.; Mo.; Mus. V.; U.V.); *C. A. Purpus* 8116, Flagstaff, Arizona, May–October, 1900 (Calif.; U.S.); *C. L. Shear* 4946, along ditch, Durango, Colorado, August 11, 1897 (Petrop.); *Forrest Shreve* 5386, alt. 2,700 meters, Mt. Lemmon, Arizona, October 1, 1917 (Gray); *P. C. Standley* 4862, alt. about 2,520 meters, Pecos National Forest, New Mexico, August 10, 1908 (N.Y.); *idem* 5002, alt. about 2,010 meters, near Pecos, New Mexico, August 17, 1908 (N.Y.); *idem* 6308, alt. 2,100–2,380 meters, in streets, Raton, New Mexico, June 21–22, 1911 (U.S.); *idem* 6503, vicinity of Antonito, Colorado, July 7, 1911 (U.S.); *idem* 7145, alt. 1,550–1,650 meters, ditches, Farmington, New Mexico, July 20, 1911 (U.S.); *idem* 7926, alt. about 1,900 meters, ditches, Cedar Hill, New Mexico, August 15, 1911 (U.S.); *idem* 40583, sandy arroyo, Pine Canyon, Guadalupe Mts., Culberson Co., Texas, August 15–17, 1924 (U.S., forma monstrosa); *idem & H. C. Bollman* 11107, creek bottoms, Ensenada, New Mexico, September 3, 1914 (U.S.); *C. H. T. Townsend & C. M. Barber* 298, alt. 2,250 meters, in Sierra Madre, Colonia García, Chihuahua, Mexico, September 1, 1899 (Berl.; Boiss.; Brit.; Del.; Field; Mo.; Par.); *John Wolf* 544, Valley of Upper Arkansas River, September, 1873 (Field); *N. P. Woodward* 2, potato field with sheep manure or wool waste, Worcester, Massachusetts, September 10, 1921 (Gray); *E. O. Wooton*, James Canyon, Sacramento Mts., New Mexico, August 11, 1899 (N.Y.); *idem*, Las Vegas Canyon, New Mexico, August 24, 1910 (U.S.); *idem*, alt. 2,490 meters, 12 miles northeast of Vermejo Park, New Mexico, August 30, 1913 (U.S.); *idem* 259, alt. 2,040 meters, White Mts., New Mexico, July 31, 1897 (N.Y.); *idem* 2544, Ensenada, New Mexico, August 16, 1904 (U.S.); *idem & Standley* 3675, alt. about 2,220 meters, White Mts., New Mexico, August 25, 1907 (U.S.).

In describing *Bidens cognata*, Greene (loc. cit.) stated that it was "allied to *B. heterosperma*." He then proceeded to differentiate it from that species, which was very easy because *B. heterosperma* was so unlike it. Here, as in certain other cases (cf. Sherff, Bot. Gaz.

BIDENS BITERNATA var. GLABRATA f. ABYSSINICA (Schz. Bip.) Sherff

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56: 494. 1913; ibid. 64: 30. 1917), Greene's error consisted in comparing the plant with the wrong species and then founding a new species upon the points of dissimilarity. His type material (*O. B. Metcalfe* 1436) is merely a low, rather much branched form of *Bidens tenuisecta* Gray, with the type of which it is connected by a number of the specimens cited above.

EXPLANATION OF PLATE XCIII

Bidens tenuisecta: a, b, fruiting specimens, ×0.66; *c, d,* exterior involucral bracts, ×3.94; *e, f,* interior involucral bracts, ×3.94; *g,* ray corolla, ×3.94; *h, i,* paleae, ×3.94; *j, k,* disc florets, ×5.91; *l* and *m* (outer), *n* and *o* (inner), achenes; *a, d, f, g, i, k, m, o,* from type; *b, c, e, h, j, l, n,* from *Metcalfe* 1436 (cotype of *Bidens cognata* Greene), in Hb. Field.

119. **Bidens straminoides** Sherff, Amer. Journ. Bot. 22: 706. 1935.

Herba annua, gracillima, 6–9 dm. alta, caule simplici aegre angulato glabro nonnullis internodiis 1–1.5 dm. longis. Folia petiolata petiolis usque ad 1 cm. longis, petiolo adjecto tantum 2–3.5 cm. longa, plus minusve bipinnata, infra valde supra sparsim tomentoso-hispida, segmentis ultimis oblongis vel (superiorum) filiformibus. Capitula pauca (±3), subcorymbose ad caulis apicem disposita pedicellis subsparsim pilosis subtenuibus 3–5 cm. longis, forsitan discoidea, demum circ. 1.4 cm. lata. Involucri bracteae subaequales extrinsecus pilis gracillimis albidis longis hispidae, exteriores circ. 4–6 elongato-lineares acutae circ. 5–7 mm. longae; interiores oblongo-ovatae. Flores ligulati non visi. Paleae nunc late nunc anguste oblongae, apice plus minusve obtusae. Achaenia atra, plana, linearioblonga, supra rarius angustata, marginibus ventreque valde tergo pluristriato aegre erecto-setosa setis e tuberculis ortis, corpore 7–8 mm. longa et 0.6–0.8 mm. lata, apice erecte setosa et biaristata aristis brunneis antrorso-hispidulis circ. 0.6–0.8 mm. longis.

Type specimen: Collected by *H. Scaetta,* No. 2272, at altitude of about 1,850 meters, Mt. Bohanga, Ruanda District, German East Africa (Mus. Cong., 2 sheets).

Distribution: Ruanda District, German East Africa.

Specimens examined: *Scaetta* 2272 (2 type sheets, Mus. Cong.).

The stems are especially elongate, nudate, and mostly less than 2 mm. thick, appearing when dry, therefore, more or less like straws. Apparently closest to *Bidens paupercula,* which differs in having more elongate achenial bodies, retrorsely barbed aristae, etc.

120. **Bidens paupercula** Sherff, Bot. Gaz. 76: 158, *pl. 12, figs. a–g.* 1923. Pl. XCIV.

Bidens ciliata DeWild. Repert. Sp. Nov. 13: 203. 1914 (non *B. ciliata* Hoffmgg. ex Fisch. et Mey. Ind. Sem. Hort. Petrop. 6: 46. 1839).

Herba annua, erecta, saepe gracillima; caule subtetragono simplici vel ramoso, 2–8 dm. alto, caule ramisque nunc glabris nunc infra valde supra debiliter piloso-scabridis. Folia petiolata petiolis saepe alatis 0.8–4.5 cm. longis, petiolo adjecto 2–10 cm. longa, pinnata vel interdum bipinnatisecta; foliolis 3 vel 5, anguste linearibus vel etiam filiformibus, acutis, minute denticuloso-ciliatis et saepe sparse hispidis, 0.2–1.8 mm. latis et usque ad 5 cm. longis. Capitula tenuiter pedunculata pedunculis 8–13 cm. longis, ad anthesin minima, pansa circ. 7 mm. lata et 6 mm. alta, subradiata. Involucri bracteae exteriores 4–9, reflexae vel reflexo-patentes, lineares, glabrae vel saepius setoso-ciliatae, apice acutae, primum (ad anthesin) circ. 2 mm. demum circ. 5–8 mm. longae; interiores lanceolatae, subglabrae vel apice saepe pubescentes, saepe paulo breviores. Flores ligulati rudimentarii, lutei, lineares, circ. 4–5 mm. longi. Achaenia (circ. 8–15 in unico capitulo) recta, anguste linearia, obcompressa, exalata, supra medium sensim usque vel fere ad apicem angustata, atra vel atro-brunnea, adpresse erecto-setosa, utrinque manifeste 8-sulcata, corpore 1–2.2 cm. longa et 0.5–1.2 mm. lata, apice erecte setoso saepe dilatata et semper biaristata aristis tenuibus retrorsum hamosis 1.2–2.5 mm. longis.

Type specimen: Collected by *Ad. Stolz*, No. 1442, in forest at altitude of 900 meters, Kyimbila, Nyassaland, July 22, 1912 (Berl., 2 sheets).

Distribution: Nyassaland to southeastern Belgian Congo.

Specimens examined: *J. Bequaert* 302, Elisabethville, Katanga, Belgian Congo, April 4, 1912 (Bruss., 2 type sheets of *B. ciliata* DeWild.); *F. A. Rogers* 10956, Elisabethville, Katanga, May, 1914 (Rog.); *Stolz* 1442 (type, Berl., 2 sheets: cotypes, Cop.; Del.; Mun.; Mus. V.).

Unlike most other African species of *Bidens*, this possesses close affinities with *B. bipinnata* L. and *B. parviflora* Willd. The type specimens were small plants, but the cotypes and other specimens later examined were much larger and better developed. From these and also from the more robust material collected by Rogers in the type locality, the original description has been amplified. *B. ciliata*

BIDENS ANDICOLA var. COSMANTHA f. BUCHTIENII Sherff (figs. *a–g*)
BIDENS PSEUDOCOSMOS Sherff (figs. *h–n*)

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DeWild. belongs here, but its name is dropped because of the earlier homonym *B. ciliata* Hoffmgg.

EXPLANATION OF PLATE XCIV

Bidens paupercula: a (fruiting) and *h* (flowering and fruiting) specimens, ×0.63; *b, k,* exterior involucral bracts, ×3.75; *c, l,* interior involucral bracts, ×3.75; *d,* ray corolla, ×3.75; *e, m,* paleae, ×2.5; *f, n,* disc florets, ×3.75; *g, o,* achenes, ×2.5; *i,* more highly divided, lower leaf, ×0.63; *j,* small portion of stem, enlarged to show shape and pubescence, ×1.88; *a–g,* from type; *h–o,* from *Bequaert* 302 (2 type sheets of *Bidens ciliata* DeWild.), in Hb. Bruss.

121. **Bidens heterosperma** Gray, Pl. Wright. 2: 90. 1853.
Pl. XCV, figs. *i–o.*

Herba annua, gracilis, erecta, glabrata, 3–6 dm. alta, paniculato-ramosa; caule ramisque tenuissimis, plus minusve tetragonis. Folia petiolata petiolis 0.3–1.5 cm. longis, petiolo adjecto 2–5 cm. longa, 1- vel 2-ternato-partita, interdum inconspicue denticulato-ciliata; foliolis paucorum inferiorum juniorumque linearibus, 1–2 mm. latis, integris; foliolis reliquorum lineari-filiformibus, 0.5–1 mm. latis, integris. Capitula discoidea vel rariter subradiata ligulis flavis angustisque (circ. 4 mm. longis), pedunculata pedunculis tenuissimis 1–5 (–10) cm. longis; ad anthesin cylindrico-turbinata, tantum 3.5–5 mm. alta et 2–3 mm. lata. Involucrum sparsim hispidum vel subglabratum; bracteis exterioribus 3–5, anguste linearibus, demum 3–5 mm. longis, quam interioribus elliptico-lanceolatis paulo brevioribus. Flores tubulosi pauci (plerumque 8–13), tantum circ. 1.5 mm. longi, 3 (rariter –5)-lobati. Achaenia linearia, glabra, tetragona vel tantum trigona, biaristata vel raro triaristata, plerumque nigra; interiora supra attenuata, 7–12 mm. longa, aristis 1–2.2 mm. longis; exteriora crassa, clavata, saepe rugosa, breviora, aristis brevibus saepe caducis.

Type specimen: Cultivated in 1852 at Cambridge, Massachusetts, from seed obtained in 1851 near the Copper Mines in New Mexico by *Charles Wright* (Gray, 2 sheets).

Distribution: Arizona and southernmost Colorado southward to the Territory of Baja California, and the states of Sonora and Chihuahua, Mexico.

Specimens examined: *J. C. Blumer* 3351, alt. 1,800 meters, open, eroding gravel slope, Manning Trail, Rincon Mts., Arizona, September 13, 1909 (Berl.; Gray); *Miss L. L. Donnelly,* alt. 1,830 meters,

Cananea, Sonora, September 1, 1909 (Calif.); *E. L. Greene* 461, Pinos Altos Mts., New Mexico, September 16, 1880 (Kew); *F. H. Knowlton* 157, alt. 2,520 meters, Walker Lake, San Francisco Mt., Arizona, September 1, 1889 (Gray); *J. B. Leiberg* 5893, alt. 2,000 meters, near Kendrick Mts., Arizona, August 27, 1901 (U.S.); *J. G. Lemmon*, Ramsey's Canyon, Huachuca Mts., Arizona, September, 1882 (Calif.); *E. A. Mearns* 2218 pro parte, canyon, east side of San Luis Mts., Chihuahua, September 11, 1893 (U.S.; cf. U. S. Nat. Mus. Bull. 56, No. 1: 89, stat. 18. 1907); *G. C. Nealley* 220, alt. 2,250 meters, Rincon Mts., Arizona, 1891 (U.S.); *C. G. Pringle* 1288, foothills of the Sierra Madre, Chihuahua, September 24, 1887 (Boiss.; Field; Kew; Mo.; Phila.; U.V.); *idem* 1289, rocky hills near Guerrero, Chihuahua, September 12, 1887 (Berl.; Boiss.; Field; Kew; Phila.); *idem* 1637, base of Sierra Madre, Chihuahua, October 8, 1888 (Berl.; Brit.; Calif.; Del.; Mun.; Mus. V.; U.V., 2 sheets); *idem* 11487½, alt. 2,400 meters, lava fields near Eslaba, Federal District, Mexico, September 17, 1903 (Berl.; Kew); *Ira L. Wiggins & D. Demaree* 4882, alt. 2,200 meters, under pines about margins of meadow, La Encantada, Sierra San Pedro Mártir, Baja California, Mexico, September 18, 1930 (Stanf.); (ex seminibus lectis a) *Charles Wright*, New Mexico, 1851 (et cult. in Horto Cantabriginensi, 1852; type material, Gray, 2 sheets).

EXPLANATION OF PLATE XCV, FIGS. *i–o*

Bidens heterosperma: i, flowering and fruiting specimen, ×0.7; *j*, exterior involucral bract, ×3.5; *k*, interior involucral bract, ×3.5; *l*, palea, ×3.5; *m*, disc floret, ×3.5; *n* (outer), *o* (inner), achenes, ×3.5; all from one (my No. "II" on sheet) of two type sheets.

122. **Bidens exigua** Sherff, Bot. Gaz. 70: 89, *pl. 11, figs. a–f'*. 1920. PL. XCVI, figs. *a–i*.

Herba annua, usque ad circ. 4.5 dm. alta; caule ramisque tenuissimis, glabratis, striatis. Folia petiolata petiolis 0.5–2 cm. longis, petiolo adjecto 3–5 cm. longa, membranacea, glabra, bipinnata; foliolis 3 vel 5, saepius 3–5-partitis; lobis linearibus, integris, subobtusis, infirme apiculatis. Capitula pauca, discoidea vel subradiata, pauciflora, tenuiter pedunculata pedunculis 2–5 cm. longis, ad anthesin 5–6 mm. longa et infra 1.5–2 mm. supra 2–3 mm. lata; cum fructibus usque ad 1.6 cm. longa et usque ad 0.5 (rariter ad 1) cm. lata. Involucrum basi sparsim hispidum vel glabratum; bracteis exterioribus 4–7, linearibus, 2–3 mm. longis, ciliatis, ad faciem glabris vel pubescentibus, ad apicem induratis; interioribus dimidio longi-

BIDENS PILOSA L. (figs. *a*, *b*, *e–j*); var. MINOR (Bl.) Sherff (figs. *c*, *d*, *k–r*)

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oribus, glabratis, lanceolatis, striatis, margine diaphanis. Achaenia linearia, tetragona, glabra vel supra ad angulos remote hispida, atra, facie unaquaque 2-sulcata, corpore 8–14 mm. longa, bi- vel triaristata, aristis usque ad 3 mm. longis, retrorsum hamosis hamis tenuibus.

Type specimen: Collected by *Charles H. T. Townsend*, No. 1513, at altitude of 1,607 meters, in Chosica Canyon, Peru, April 20, 1913 (U.S.).

Distribution: Central and southern Peru, near the coast, and southeastward into northern Argentina.

Specimens examined: *J. F. Macbride* 2873, alt. about 900 meters, dry, sandy, rocky slope, Chosica, Peru, March 11–13, 1923 (Field); *idem* 3209, alt. about 2,100 meters, stony slopes, shale and gravel, Huánuco, Peru, April 5–8, 1923 (Field); *Ludwig Savatier* 570, Matucana, Peru, April 22, 1877 (Par.); *F. Schickendantz* 16, Yacatula (near Belén), Prov. Catamarca, Argentina, December, 1879 (Berl., ex *herb.* Hieronymi; nom. vernac., amor seco); *Townsend* 1513 (type, U.S.); *A. Weberbauer* 5293, alt. 1,500–1,600 meters, San Bartolomé, Peru, April 4, 1910 (Berl.); *idem* 7401, alt. 2,200–2,300 meters, open, mixed formation, Torata, Prov. Moquegua, Peru, March 17–18, 1925 (Field).

Related to *Bidens subalternans* through the latter's var. *simulans*, which in doubtful cases seems best distinguished by its broader leaf divisions.

EXPLANATION OF PLATE XCVI, FIGS. *a–i*

Bidens exigua: a, entire young flowering plant, ×0.57; *b*, subfruiting head, ×0.57; *c*, *d*, exterior involucral bracts showing variation in pubescence, ×4.56; *e*, interior involucral bract, ×4.56; *f*, palea, ×4.56; *g*, disc floret, ×4.56; *h* (outer), *i* (inner), achenes, ×4.56; all from type.

123. **Bidens parviflora** Willd. Enum. Hort. Berol. 848. 1809. Pl. XCVII, figs. *a–g*.

Bidens macrosperma H. G. ex Fischer, Cat. Jard. Pl. Razoum. Gorenki 59. 1808; ed. 2. 37. 1812 (nomen).

Bidens pauciflora Poir. in Lam. & Poir. Dict. Bot. Suppl. 1: 630. 1810.

Bidens multifida Desf. Cat. Hort. Par. ed. 3. 186. 1829; nomen.

Bidens Messerschmidii Turcz. ex DC. Prodr. 5: 602. 1836.

Herba annua, erecta, glabrata vel hinc inde sparsim hispida, gracilis vel rarius subrobusta, 2–7 dm. alta. Folia petiolata petiolis

0.5–2.5 cm. longis, petiolo adjecto 4–13 cm. longa, 2–3-pinnata, segmentis linearibus vel oblongo-linearibus, membranaceis, subacriter calloso-apiculatis, marginibus involutis obsolete ciliatis, 1–4 (rarius –8) mm. latis. Capitula tenuiter pedunculata pedunculis plerumque circ. 4–6 cm. longis, discoidea, ad anthesin cylindrica, 7–10 mm. alta et circ. 3 mm. lata. Involucri bracteae exteriores circ. 5, lineares, acutae et indurato-apiculatae, tergo subglabrae, margine sparsim spinuloso-ciliatae, demum reflexo-patentes et 5–11 mm. longae, quam interiores late oblongo-lineares demum multo breviores. Flores tubulosi 4-lobati; paleis valde membranaceis, demum elongatis et corporibus achaeniorum etiam interiorum saepe fere aequalibus. Achaenia 6–13, odorata (ex Messerschm.), atra, linearia, utrinque attenuata, plus minusve tetragona, erecto-setosa praecipue supra, omnino 16–24-striata, corpore 1.5–2 cm. longa et 0.7–1.4 mm. lata, biaristata aristis erectis, retrorsum hamosis, 2–4 mm. longis.

Type specimen: Collected at Lake Baikal, Siberia (Willd.).

Distribution: Lake Baikal region of Siberia eastward to Amur and eastern Manchuria and southward to central China (provinces of Szetschuan, Hupeh, etc.), Corea, and Japan.

Specimens examined: *Anon.*, Transbaikal region, Siberia (Mus. V.); *anon.*, Lake Baikal, Siberia (Willd., type); *anon.*, Usuri (Ussuri), southeastern Manchuria (Berl.; Mus. V.); *Bretschneider*, Peking, Prov. Chi-li, China (Berl.); *idem* 388, Peking (Kew); *Y. Chen* 701, alt. 960 meters, Hsien Shan Hsien, western Hupeh, China, September 17, 1926 (Calif.); *N. H. Cowdry* 895, dry roadsides, Chi-fu (Chefoo), Prov. Shan-tung, China, June–August, 1920 (Kew); *O. Debeaux* 91, mica schist hills, Chi-fu (Tche-fou), China, September 2, 1860 (Par.); *E. Farber*, mountains, vicinity of Chi-fu (Tschi-fu), China, 1889 (Berl., 2 sheets; Cop.; Par.; U.V.); *Farges* 81, China (Par., 2 sheets); *Urbain Faurie* 419, common, Fusan, Corea, October 4, 1901 (Berl.; Par.); *idem* 420, in fields, Chinampo, Corea, September 12, 1901 (Berl.; Brit.; Par.); *idem* 1052, in fields, Chinampo, September 8, 1906 (Berl.; Brit.); *idem* 1916, Shinano, Japan, September 15, 1898 (Berl.; Kew; U.V.); *Giuseppe Giraldi* 272, northern Shen-Si (Chen-Si), China, September 18, 1891 (Berl.; Flor.); *idem* 2894, Mt. Ki-fon-San, near Pao-Ki-Scen, northern Shen-Si, October, 1898 (Flor.); *idem* 2895, In-Kia-pú (In-kio-po), northern Shen-Si, August, 1896 (Berl.; Flor.); *idem* 2896, hill near Fu-kio, northern Shen-Si, June, 1893 (Flor.); *idem* 2897, hill near Fu-kio, northern Shen-Si, October, 1894 (Berl.; Flor.); *Aug. Henry* 2875, Prov. Hupeh, China, 1885–1888 (Brit.; Gray; Kew; Par.); *idem* 4791, I-chang,

Patung Distr., Prov. Hupeh, China (Kew); *idem* 7011, Prov. Hupeh, 1885–1888 (Berl., 2 sheets; Gray; Kew); *Hugh* 24, China, August, 1897 (Brit.); *H. E. M. James*, Kirin to Tsitsihar, Manchuria, communic. June, 1887 (Kew); *F. Karo* (Plantae Amuricae) 160, Blagowjestschensk (Blagovestchensk), Amur, Siberia, August, 1898 (Berl.; Boiss.; Brit.; Cop.; Del., 2 sheets; Kew; Mus. V.; Par., 2 sheets); *idem* 1534, eodem loco, September, 1905 (Brit.); *Vladamir Komarôv* 1534, near Ta-moudan, Prov. Kirin, Manchuria, September 8, 1896 (Berl.; Brit.; Flor.; Gray; Kew, 2 sheets); *idem* (similiter numerat.) 1534, Jalu-dsian River, about Kazami, northern Corea, September 21, 1897 (Kew); *B. Krug* 73 and 73*a*, Forestry Garden, Tsingtau, Kiao-chau region, Prov. Shan-tung, China, September 15, 1905 (Berl.); *idem* 185, Lehis Mts., China, September 15, 1906 (Berl.); *idem* (Imperial Forestry Office of Tsingtau) 433, Lauschen Mts., August–September, 1910 (Berl.); *J. C. Liu* 1413, alt. about 900 meters, hillside, Kalgan, Prov. Chi-li, China, September 9, 1927 (Calif.; nom. Sinorum, Kui chen Ts'ao; hoc nomine *Bidens bipinnata* similiter apellatur); *Maximowicz* (*iter secundum*), upper Usuri, southeastern Manchuria, 1860 (Berl.; Boiss.; Brit.; Cop.; Flor.; Gray; Kew; Mun.; Mus. V.; Par.); *Jardin de Montpelier*, specimen cult. e seminibus a Fischero communicatis (itaque pro *Bidente macrosperma* Fisch. probabiliter dignum; Del.); *Nebel*, mountain slopes, Tsingtau, Kiao-chau (Kiautschou) region, Prov. Shan-tung, China, 1899–1900 (Berl.);[1] *G. N. Potanin*, in road, Paiho River below She-pu, northern Szetschuan (Sze-chuan), China, July, 1885 (Par.); *idem*, Distr. Naitiha, Szetschuan, September 11, 1885 (Kew; Par.); *A. Provost* 34, Kou-péi-Kéou, China, September, 1891 (Par., 3 sheets); *J. Ross* 137, Prov. Sching-King, northern China (Kew); *idem* 286, Kaichow to Kinchow, northern China (Kew); *Schottmüller* 349, Chi-fu (Chefoo), Prov. Shan-tung, China, August, 1861 (Berl.); ex *herb. Schumacheri*, cult. in Hort. Hafniae, ann. 1808, sub nom. *B. macrosperma* (Cop., 2 sheets); *C. Silvestri* 2556, Mt. Ku-cheng (Ku-tcen), alt. 600 meters, Prov. Hupeh, China, July–August, 1906 (Flor.); *idem* 2557, Mt. Triora, alt. 1,950 meters, Prov. Hupeh, China, July 3, 1907 (Flor.); *idem* 2558, Mt. Kian-Scian, alt. 2,000 meters, Prov. Hupeh, China, September, 1907 (Flor., 3 sheets); *Don Giovanni Tsan*, Pouoli, northern Shen-Si, China (Flor.); *George Staunton*, China (Del.); *idem*, between Peking and Jehol, Prov. Chi-li, China (Brit.); *Turczaninow*, Transbaikal

[1] The "*B. chinensis* W." specimen from "China" ex Herb. Petrop., cited by DeCandolle (Prodr. 5: 602. 1836) for *B. parviflora*, is *B. bipinnata* L.

region, Siberia (Kew); *idem*, on rocks at Selenga and elsewhere, Transbaikal region, Siberia, 1829 (cum inscript. *"Bidens Messerschmidii mihi Ammann. descript. pag.* 148;" Del., 2 sheets; Oxf.); *idem* 1232, iisdem locis, 1831 (Del.); *Wawra* (*Circumnav. H. M. Frigate Donau*) 1232, Chi-fu (Chefoo), Prov. Shan-tung, China, 1868–1871 (Mus. V., 2 sheets); *F. W. Williams* 16052, Peking, Prov. Chi-li, China, September, 1867 (Brit.).

A species not easily confused with any other Asiatic species. Known to Messerschmid as early as 1739 (or earlier),[1] it was not properly published until 1809. In that year Willdenow gave a technical description of it, citing as an equivalent the name *B. macrosperma* Fisch., which had been published without description in 1808. I have seen very old-looking sheets of material (e.g., Mus. V.) with merely the name *macrosperma* on the label and these match perfectly the Willdenow specimens (Willd.) of *B. parviflora*. Poiret's private specimen of *B. pauciflora* Poir. (Par.) likewise matches the Willdenow specimens. Desfontaines' *B. multifida* was merely a nomen, listed as being one used at the Paris Botanical Garden, and was equated by Desfontaines himself with *B. pauciflora* Poir. Certain very old-looking sheets of material labeled *Bidens multifida* Desf., still extant in herbaria (e.g., Mus. V.) are, furthermore, merely *B. parviflora* Willd. Turczaninow's original specimen of his *B. Messerschmidii* is in the DeCandollean Prodromus Herbarium (Del.) and likewise is *B. parviflora* Willd.

EXPLANATION OF PLATE XCVII, FIGS. *a–g*

Bidens parviflora: a, fruiting specimen, ×0.68; *b*, exterior involucral bract, ×3.41; *c*, interior involucral bract, ×3.41; *d*, palea, ×3.41; *e*, disc floret (4-lobed), ×3.41; *f*, pollen grains, ×272; *g*, achene, ×2.72; *a*, *g*, from Poiret's own specimen (type of *Bidens pauciflora* Poir.) in hb. Poir. in hb. Moquin-Tandon in hb. Cosson in Hb. Par.; *b–f*, from identical material on the Bernhardi herbarium sheet, in Hb. Mo.

124. **Bidens Lemmonii** Gray, Syn. Fl. N. Amer. 1, pt. 2: 297. 1884. Pl. XCVII, figs. *h–n*.

Herba annua, gracilis, erecta, glabra, 2–3 dm. alta; caule tenui, plerumque purpurascenti, paniculato-ramoso. Folia tenuiter petiolata petiolis plerumque 0.8–1.7 cm. longis, petiolo adjecto 2–4 cm.

[1] B. Daurica, saxatilis, foliis Apii v. Cicutae magis, flore luteo, nudo, semine Scandicis instar longissimo, odorato; [etc.]. . .Messerschmid in Amman. Stirp. Rar. Imp. Ruthen. Icon. et Descript. 148. 1739.

BIDENS PILOSA var. RADIATA Schz. Bip. (figs. *a–h*)
BIDENS TENERA O. E. Schulz (figs. *i–o*)

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longa, minute ciliata, irregulariter biternata, segmentis linearibus, non serratis, apice acutis, plerumque 0.5–1 mm. (in speciminibus parvis saepe 3.5–4.5 mm.) latis. Capitula discoidea, tenuiter pedunculata pedunculis 1–6 (–9) cm. longis; ad anthesin subcylindrica et tantum 3–5 mm. alta et 1–2 mm. lata (bracteis exterioribus non inclusis). Involucrum glabratum vel sparsim hispidum; bracteis exterioribus 3 vel 4, demum tenuiter linearibus, membranaceis, ciliatis, longissimis (1–2.5 cm.), plerumque foliaceis et saepe irregulariter pinnato- vel etiam bipinnato-partitis (segmentis linearibus); interioribus demum oblongo-lanceolatis, 6–8 mm. longis. Flores tubulosi 5–9, tantum circ. 1.5 mm. longi, plerumque 3-lobati. Achaenia linearia, tetragona, rufo-badia, glabra, corpore 1.2–1.4 cm. longa, biaristata, interiora supra attenuata; aristis retrorsum hamosis, circ. 2 mm. longis.

Type specimen: Collected by *John Gill Lemmon*, Apache Pass (Fort Bowie), Chiricahua Mountains, Arizona, September, 1881 (Gray).

Distribution: Southern Arizona southward into Lower (Baja) California and the State of Mexico, Mexico.

Specimens examined: *T. S. Brandegee*, Sierra de San Francisquito, Lower California, October, 1890 (Field; Phila.); *idem*, La Chuparosa, Lower California, October 16–17, 1893 (Calif.; Kew); *idem*, Sierra de la Laguna, Lower California, October 2, 1899 (Calif.; Field); *idem* 321, San Francisquito Mts., Lower California, October 20, 1890 (Calif.); *J. G. Lemmon*, Apache Pass (Fort Bowie), Chiricahua Mts., Arizona, September, 1881 (type, Gray: cotype, Field); *idem* 334, vicinity of Fort Huachuca, southern Arizona, 1882 (Gray); *idem* et *uxor*, Helen's Dome, Chiricahua Mts., Arizona, September, 1881 (Carn.; Brit.; Calif.; Kew); *iidem* 334, peak south of Apache Pass, Arizona, September, 1881 (Calif.); *C. G. Pringle* 6477, alt. 2,550 meters, Sierra de Ajusco, Federal Distr., Sept. 8, 1896 (Berl., 2 sheets; Boiss.; Brit.; Calif.; Can.; Del.; Field; Kew; Mo.; Mun.; Mus. V.; U.V.); *idem* 11489, alt. 2,400 meters, lava fields near Eslava, Federal Distr., September 17, 1903 (Berl.; Cop.; Field; Kew).

The 3 or 4 outer involucral bracts are very long (1–2.5 cm.), commonly foliaceous, and often irregularly pinnate- or bipinnate-parted, this last character being unusual for the genus. Another exceptional character is the 3-lobed limb of the disc corollas.

EXPLANATION OF PLATE XCVII, FIGS. *h–n*

Bidens Lemmonii: h, entire small fruiting plant, ×0.68; *i*, leaf from larger specimen showing extreme of decompound habit, ×0.68;

j, exterior involucral bract (of simple kind; the compound kind often found on this species here omitted), ×4.77; *k*, interior involucral bract, ×4.77; *l*, palea, ×4.77; *m*, disc floret (atypic in having 4 instead of for this species the usually 3 corolla teeth), ×4.77; *n*, achene, ×2.72; all from type sheet (which bears one small and one large specimen).

125. **Bidens capillifolia** Sherff, Bot. Gaz. 64: 24. 1917. Pl. XCVIII.

Herba tenuis, annua, +3 dm. alta, ramosa, glabra (vel basibus ramorum hispida); caule et ramis subteretibus, striatis. Folia petiolata petiolis 0.6–1.5 cm. longis, petiolo adjecto 2–6 cm. longa, 1–2-pinnata; segmentis linearissimis, margine integris, 0.5–1 mm. latis. Capitula terminalia, discoidea, longe et tenuiter pedunculata, pedunculis 4–15 cm. longis. Involucrum basi plus minusve setoso-hispidum; bracteis exterioribus 3–5, linearibus, glabris vel sparsim hispidis, 6–8 mm. longis, primo discum juvenem multo excedentibus; interioribus anguste lanceolatis, glabris vel sparsim hispidis, margine diaphanis, 4–6 mm. longis. Achaenia linearia, tetragona, biaristata aristis retrorsum hamosis; 1–3 exteriora rufo-badia, sparsim tuberculato-hispida, corpore circ. 6 mm. longa; interiora nigra (nisi ad apicem), elongata, glabra vel supra remote hispida, corpore 9–14 mm. longa.

Type specimen: Collected by *Charles Melvin Barber* and *Charles Henry Tyler Townsend*, Sierra Madre, State of Chihuahua, Mexico, July 17, 1899 (U.S.).

Distribution: Known only from type locality of Sierra Madre, State of Chihuahua, Mexico.

Specimens examined: *Barber & Townsend*, Sierra Madre, Chihuahua (type, U.S.).

EXPLANATION OF PLATE XCVIII

Bidens capillifolia: a, subflowering and fruiting spray, ×0.69; *b*, exterior involucral bract, ×4.16; *c*, interior involucral bract, ×4.16; *d*, palea, ×4.16; *e*, disc floret, ×5.54; *f*, achene, ×2.77; all from type.

126. **Bidens biternata** (Lour.) Merr. & Sherff in Sherff, Bot. Gaz. 88: 293. 1929. Pl. XCIX, figs. *a* and *c–m*.

Bidens pilosa L. var. β. L. Syst. Nat. ed. 12. 2: 534. 1767; Murray, Syst. Veg. ed. 13. 610. 1774.

Coreopsis biternata Lour. Fl. Cochinch. ed. 1. 508. 1790; ibid. ed. 2. 622. 1793.

BIDENS PILOSA var. BIMUCRONATA (Turcz.) O. E. Schulz (figs. *a–i*)
BIDENS ACUTICAULIS Sherff (figs. *j–r*)

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Bidens chinensis Willd. Sp. Pl. 3: 1719 (quoad synonyma et herb. Willd. num. 15023, fol. 4). 1804.

Bidens peduncularis Gaud. Voy. Freyc. Bot. 464. 1826.

Actinea biternata (Lour.) Spreng. Syst. 3: 474. 1826.

Bidens Wallichii DC. Prodr. 5: 598. 1836.

Bidens Wallichii var. *bimensis* Miquel, Fl. Nederl. 2: 78 (ex descript. et patria). 1856.

Bidens pilosa var. *β. Wallichii* (DC.) C. B. Clarke, Compos. Ind. 141. 1876.

Bidens pilosa var. *β. discoidea* f. 4. *subbiternata* O. Kuntze, Rev. Gen. Pl. 1: 322 (quoad pl. Birmam, fide O. E. Schulz, Bot. Jahrb. 50, Suppl. 179. 1914). 1891.

Bidens Robertianifolia Lévl. & Vant. in Fedde Repert. Nov. Spec. 8: 140. 1910.

Bidens chinensis f. *simplicifolia* O. E. Schulz, Bot. Jahrb. 50, Suppl. 181. 1914.[1]

Bidens Mayebarai Kitamura, Compos. Nov. Japon. 21. 1931.

Folia foliolis imis plerumque bipinnata; achaeniis corpore demum 0.7–2 cm. longis..... *B. biternata* sensu stricto.

Folia rarius bipinnata; achaeniis corpore demum usque ad 2.5 cm. longis.

Caulis glaber, foliolis plus minusve glabris, involucro plus minusve piloso..... var. *β. glabrata* sensu stricto.

Caulis pilosus tomentoso-hirtusve, foliolis dense tomentoso-pilosis vel subhirtis, involucro plerumque dense hirto.

var. *glabrata* f. 1. *abyssinica.*

Herba annua, erecta, 0.3–1.5 m. alta; caule tetragono, olivaceo-brunneo, glabro sed ad nodos pilosulo, ramis erecto-patentibus ramoso. Folia petiolata petiolis pilosulis 1.5–5 cm. longis, petiolo adjecto 0.5–1.5 dm. longa, membranacea, utrinque disperse pilosa, ciliata, serrata, pinnatim partita (rarissime indivisa); foliolo terminali oblongo-ovato vel etiam lanceolato, ad apicem acuminato, ad basim

[1] We may note also *Bidens elevata* Solander mss. (Pl. Nov. Hollandiae vol. 2 in Herb. Brit.). This apparently has never hitherto been published. It is accompanied with the synonyms *Agrimonia molucca* Rumph. Amb. 6. p. 38, *pl. 15, fig. 2; Bidens pilosa β.*, L. Sp. Pl. Thus, ex synon., it reduces to *B. biternata.*

In addition, the following pre-Linnean synonyms are presented, as being of considerable importance in the nomenclatural history of the species: Chrysanthemum chinense foliis plurifariam divisis Halicacabi peregrini aemulis Pluk. Phytogr. *pl. 22, fig. 4* (excl. synon.). 1691; *idem*, Almag. Bot. 100 (*excl. synon.*). 1696; Agrimonia molucca Rumph. Herb. Amboin. 6: 38, *pl. 15, fig. 2.* 1750.

cuneatim angustato, 2–5.5 cm. longo et 1–2 cm. lato; foliolis lateralibus 2–4 jugis, terminali proximis ovatis vel ovato-lanceolatis, breviter decurrentibus; sequentibus majoribus, breviter petiolulatis; infimis manifeste petiolulatis, rursus partitis segmentis lateralibus ovatis sessilibus uni- vel subbijugis. Capitula subradiata, ad anthesin minuta, 5–7 mm. lata et 4–6 mm. alta, 20–30-flora, pedunculata pedunculis tenuibus 1–7 cm. longis. Involucrum basi glanduloso-pilosum; bracteis exterioribus 7–10, anguste linearibus et non superne spathulato-dilatatis, acutis vel subacutis, hirsutis, 3–6 mm. longis; bracteis interioribus ovato-lanceolatis vel late ellipticis, sub apice subito angustatis in apiculum puberulum, marginibus late hyalinis, plerumque exteriores paulo superantibus. Flores ligulati plerumque 3, albidi, steriles, ligula oblongo-elliptici, apice circ. 3-crenata, circ. 4 mm. longi, nullo stylo. Achaenia linearia, subattenuata, pro maxima parte nigrescentia, apice aristisque flavido-brunnea, erecta vel subrecurvata, paleas manifeste superantia, obcompresso-tetragona, glabra vel (praecipue exteriora) superne setis erecto-patentibus hispida, longitudinaliter omnino 8-sulcata, corpore 0.7–2 cm. longa, plerumque 4-, raro 3- vel 5-aristata, aristis retrorsum hamosis lateralibus 2.5–3.5 mm. longis mediis 2–2.5 mm. longis.

Type specimen: Said by Loureiro to have grown in fields near Canton, China (see text).

Distribution: Widely distributed in the Eastern Hemisphere: Japan, Corea, and Manchuria, southward through all China to French Indo-China, Siam, and Malay Peninsula, westward through British India and Afghanistan to Arabia; Liu-kiu Islands, Chusan Islands, Philippine Islands, etc.; Malaysia (Borneo, Java, etc.), Melanesia (Molucca Islands, Bismarck Archipelago, etc.), Polynesia (Fiji Islands, Tonga or Friendly Islands, etc.); Australia; in Africa from northernmost German East Africa, southern Sudan and Portuguese West Africa south to Natal and German Southwest Africa; off the African coast (islands of Sokotra, Madagascar, Réunion [Bourbon], Cape Verde, Madeira, etc.); adventive in 1859 in southern France (*Tuezkiewicz* 3118).

Specimens examined: *J. E. T. Aitchison* 660 and 982, open, stony ground, Shálizán, Kurrum Valley, Afghanistan, 1879 (Boiss.; Gray; Kew); *anon.*, Tokyo, Japan, October 3, 1893 (U.V.; nom. japonicum, sendan-gusa); *C. A. Backer* 18215, alt. 10 meters, Poeger, Java, 1914 (Buit.); *idem* 20605, Madoera Isl., Dutch East Indies, 1915 (Buit.); *F. Bachmann*, Pondoland, southeastern Africa, April, 1888 (Berl.); *idem* 1586, eodem loco, 1887–1888 (Berl.); *Balansa* 910, near

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Quang-yen, Tonkin (Tongking), French Indo-China, August, 1885 (Par.); *Banks & Solander*, New Holland (Australia), 1770 (Berl.); *R. Baron*, Madagascar (Berl.); *J. Bermejos* 177 (Bur. Sc. No. 345), Palawan, Philippine Isls. (Berl.; Man.; U.S.); *James Bisset*, Yokohama, Japan, October, 1876 (Kew); *R. P. Bodinier*, Hongkong, China (Par.); *Boivin* 155, Réunion, 1846–1852 (Berl.; Boiss.; Del.; Par.; forma var. *glabratae* f. *abyssinicae* adpropinquans); ex *Bot. Instit., Science College, Imper. Univ. Tokyo*, ex Prov. Musashi, Japan, September 23, 1885 (U.V.; nom. japonicum, sendan-gusa); *Bretschneider* 1887, mountains west of Peking, Prov. Chi-li, China, 1881 (Brit., 2 sheets; forma valde *B. bipinnatae* adpropinquans); *R. Brown* 2121, Australia, 1802–1805 (Kew); *Burmann* 180, Japan (Del.); *R. Büttner* 106, San Salvador, Angola, January 8, 1885 (Berl.); *J. Cardoso* 95, Cape Verde Isls., 1895 (Kew); *L. Chanet* 99, Chengting-fu (Tcheng Ting Fau), Prov. Chi-li, China, September 3, 1905 (Del., 2 sheets); *Cheo & Wilson* 241 (Hb. Univ. Nanking No. 12887), roadside, Mo Kan Shan, Prov. Che Kiang, China, September 7, 1926 (Gray); *Aug. Chevalier* 9787, L'Oubangui (Mbanga) and Chari, Sudan, September 9–10, 1903 (Del.); *C. B. Clarke* 22374*B*, alt. 1,800 meters, Dalhousie, India, September 13, 1874 (Brit.); *idem* 24823*B*, alt. 1,200 meters, Parasnath, India, November 18, 1874 (Brit.); *Cole* 48, Madras, India (Kew); *H. Cuming* 593, Philippine Isls. (Berl.); *idem* 594, eodem loco (Berl.; Brit.; Del.); *idem* 596, eodem loco (Mus. V.); *Lady Dalhousie*, Simla, India, September 2 (Del.); *R. P. David* 15, plains of Petcheli and mountains north of Peking, Prov. of Chi-li, China, 1863 (Par., 3 sheets; forma foliis valde bipinnatifidis, lobis acutis, *B. bipinnatae* adpropinquans; forsan hybrida?); *idem* 21, environs of Peking, 1865 (Par.; forma *Davidii* numero 15 aequalis); *Delavay* 603, Tapintze, southern Ten-tchouan, China, September 7, 1882 (Par.) and September 22, 1887 (Par.); *M. & Mme. Dieterlen* 86*b*, Léribé, Basouto-(Basuto-) land, southeastern Africa (Berl.); *Dinter* II–18, in grassy places, Okanhandja (Okanjande), German Southwest Africa, March 19, 1906 (Berl., 2 sheets); *J. R. Drummond* 25726, Karnal Jungle, Punjab, India, August 28, 1886 (Kew); *idem* 25727, Karnal-Ghogripur, Punjab, August 12, 1886 (Kew); *Eberhart* 2568, Hoi-mit, French Indo-China (Par.); *idem* 3338*bis*, Than-moi, Prov. Langson (Lang Son), French Indo-China (Par.; nom. indig., cay-nu-ao); *M. P. Edgeworth*, northwestern India, 1844 (Kew); *R. Endlich* 77*a*, alt. 1300 meters, Kiboquoto, eastern Africa, July, 1909 (Mun.); *idem* 557, alt. 1,100 meters, on the Kikafu, Kilimanjaro, German East Africa, August, 1909 (Berl.; Mun.);

F. Evrard, Tsien, Manchuria, 1891 (Berl., 2 sheets); *idem* 154, near Saigon, French Indo-China, October 21, 1920 (Par.); *idem* 225, Dalat, French Indo-China (Par.); *E. Faber*, Shanghai, China, 1886 (Berl., 2 sheets); *U. Faurie* 210*bis*, wet places, Tamsui, Formosa, May 22, 1903 (Brit.; Mus. V.); *idem* 416, common in wet, sandy places, Corea, July 23, 1901 (Berl.; Brit.; Par.); *idem* 418, common in fields of central Corea, September 6, 1901 (Berl.; Par.); *idem* 845, Korisho, Formosa, March, 1914 (Del.); *idem* 847, alt. 750 meters, Arisan, Formosa, June, 1914 (Del.); *idem* 1053, in fields, Seoul, Corea, September, 1906 (Berl.; Del.); *idem* 1917, Prov. Shinano, Japan, September 15, 1898 (Berl.; Kew; U.V.); *Fischer* 4, Otjimbingue, Ilse, German Southwest Africa, 1897 (Berl.); *Forster*, Tongatabu (Tongataboo), Tonga Isls. (Kiel, sub nom. *Bidente pilosa* Forst. Prodr.); *E. E. Galpin* 1332, alt. 570 meters, Sheba Battery, Kaap Valley, Barbarton, Transvaal, March, 1891 (Kew); *Gaudichaud* (*Voyage of the Bonite*), Macao, Prov. Kwang-tung, China, 1836–1837 (Par.); *A. Germain* 109, Cochin-China (Par.); *L. S. Gibbs* 2724, British North Borneo, January, 1910 (Kew); *Giuseppe Giraldi* 273, Pe-ling Mts., northwestern China, October, 1894 (Berl.); *idem* 2899, Ko-tu-pa, southern Shen-si, China, July, 1895 (Berl.); *G. W. Groff*, around fruit trees, Sun Ooi, Lai Ngok Village, Canton Delta, Kwangtung Prov., March 18, 1918 (Calif.; nom. incolarum, Kam p'un ngan chan); *H. Hallier*, San Ramón, Prov. Zamboanga, Mindanao, Philippine Isls., February, 1904 (Man.); *H. G. Hallier* 27, cult. in Horto Bogoriensi, Buitenzorg, Java, March 27, 1893 (Boiss.; Man.); *Hana* 298, Hongkong, China, (Gray); *Harmand*, Poulo-Condor Isls., French Cochin-China, 1875–1877 (Par.); *Aug. Henry* 388, Prov. Hupeh, China, 1885–1888 (Berl., type of *Bidens chinensis* f. *simplicifolia* O. E. Schulz); *idem* 2086, alt. 300 meters, Ape's Hill, Formosa (Kew; forma capitulis foliisque minimis); *idem* 2491, Ichang, Patung Distr., Prov. Hupeh, China (Kew; forma foliis *Bidenti segetum* subsimilis); *idem* 2794, Ichang and vicinity, 1885–1888 (Boiss.; Gray; Kew; Par.); *idem* 8574, Hainan Isl., China, 1889 (Par.); *idem* 8269, eodem loco, November, 1889 (Berl., 2 sheets; Boiss., sub num. 8769); ex *herb. Heynei* 299c, India (Del.); *Fr. Hens* 286, alt. 480–600 meters, Lutete, Belgian Congo, April 1, 1888 (Boiss.; U.V.); *ed. R. F. Hohenacker* 276, near Mangalor, India (Del.; Mus. V.); *idem* 1355, Khoondas, Nilgiri Hills, India, December (Del., 2 sheets); *C. Holst* 2908, alt. 50 meters, Amboni, Distr. Usambara, German East Africa, June 24, 1893 (Berl., 2 sheets); *Em. Holub*, Bechuanaland (Kew); *J. D. Hooker & T. Thomson*, alt.

BIDENS PILOSA var. BIMUCRONATA f. ODORATA (Cav.) Sherff (figs. *a–h*);
var. ALAUSENSIS (H.B.K.) Sherff (figs. *i–o*)

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0–1,200 meters, Khasia, India (Kew, 2 sheets); ex *Hort. Bot. Calcutt., Wallich Cat.* No. 3189, *Comp.* No. 299*a*, India (Berl., 2 sheets; Del.); *Kotobuki Ichikawa* 398, Nagasaki, Japan, August 15, 1924 (Calif.); *G. De l'Isle*, river near Le Barnica, St. Paul, Réunion (Kew; Par.; forma var. *glabratae* f. *abyssinicae* adpropinquans); *V. Jacquemont* 377, India (Par.); *idem* 426, Prov. Delhi, India (Par., 4 sheets); *J. G. Koenig*, Coromandel, India, 1776 (Brit.); *Krauss*, banks of Umbaar River, Natal, December, 1839 (Mun.); *B. Krug* 70, Forestry Garden, Tsingtau, Prov. Shan-tung, China, September 14, 1905 (Berl.); *idem* 177, eodem loco, September 14, 1906 (Berl., 2 sheets); *idem* 445, Krautschou, Lauschan Mts., Prov. Shan-tung, August–September, 1910 (Berl.); *Labillardière*, Amboina Isl., Molucca Isls. (Par.); *idem*, Java (Del.); *H. Lecomte & A. Finet* 1252, Barka, French Indo-China, November, 1911 (Par.); *iidem* 1733, Angkor-Thom, Siam, December 12, 1911 (Par.); *Leduc*, Mong-Tze, Prov. Yun-nan, China, September 14, 1890 (Par., 4 sheets); *E. Lefèvre* 4, Cochin-China, September 25, 1864 (Par.); *E. Licent* 798, Pei-ta-ho (Pei-tai-ho), Prov. Chi-li, China, September, 1914 (Brit.); *D. H. Linder* 1699, rich, moist soil, Tshumbiri, Belgian Congo, December 15, 1926 (Berl.); *A. Loher* 3626 pro parte, Prov. Benguet, Luzon, Philippine Isls. (Man.; in Mun. cum *B. pilosa* var. *minore* commixta); *idem* 5084, Tonglon, Prov. Benguet, Luzon (Kew); *Macgillivray* 63, Lizard Isl., northeast coast of Australia, April, 1861 (Brit.; forma *B. bipinnatae* adpropinquans); *E. E. Maire* 987, vicinity of Yun-nan-sen, Prov. Yun-nan, China (Kew); *R. Marloth* 1373, alt. 1,200 meters, Okahandja, Hereroland (Damaraland), German Southwest Africa, May, 1886 (Berl.); *Maximowicz, iter secundum*, Nagasaki, Japan, 1863 (Par.); *Kanjiro Mayebara*, Sashiki, Prov. Higo, Japan, October 19, 1926 (Kioto; duplicate type of *Bidens Mayebarai* Kitam.; forma foliis simplicibus; achaeniis *B. bipinnatae* adpropinquans); *F. A. McClure*, 1 meter high, grassy field, Kingchow, Isl. Hainan, southeastern China, October 14, 1921 (Calif.); *idem*, alt. 10 meters, roadside near Kingchow, April 5, 1922 (Calif.); *R. C. McGregor* 2666, riverside, Dupax, Prov. Nueva Vizcaya, Luzon, Philippine Isls., March, 1912 (Man.); *E. A. Mearns*, Santo Domingo de Basco, Batan, Philippine Isls., May 27, 1907 (Man.); *E. D. Merrill*, bamboo thicket and border of dry thicket, Honam Isl., Canton, Kwangtung Prov., China, October 13–November 9, 1916 (Calif., 2 sheets); *idem* 414, Prov. Camarines, Luzon, Philippine Isls., December, 1914 (Par.); *idem* 3335, sandy shore, Puerta Galera, Mindoro, Philippine Isls., October–November, 1903 (Berl.; Man.; Par.); *idem* 3647, open waste places,

alt. 1–2 meters, Caloocan, Prov. Rizal, Luzon, November 25, 1903 (Kew; Man.); *idem* 4311, Prov. Benguet, Luzon, November 14, 1905 (Kew; Man.; Par.); *Metz* 1355, Khoondas, Nilgiri Hills, India, December, 1854 (Par.); *J. Motley* 472, Bangarmassing, Borneo, 1857–1858 (Kew); *Mousset* 209, alt. about 900–950 meters, east Java, December 12, 1912 (Man.); *Genji Nakahara*, Shiringai, Taihoku, Formosa, August, 1905 (Penn.); *idem*, Toroku, Formosa, September, 1905 (Penn.); *idem* 386, Formosa, eodem tempore (Man.); *idem* 401, Sekiko, Formosa, eodem tempore (Man.; forma vix typica); *F. P. Odubre*, mountain side, San Guintin, Pangasinan, Luzon, Philippine Isls., January 1, 1913 (Man.); *Richard Oldham* 258, Tamsuy (Tamsui), Formosa, 1864 (Berl.; Brit.; Gray; Kew; Mus. V., 2 sheets; Par.); *F. Otanes*, along stream, Umingan, Prov. Pangasinan, Luzon, Philippine Isls., April 22, 1914 (Man.; Mo.); *F. G. Overlaet*, Kafakumba, Belgian Congo, April, 1925 (Field); *A. Petélot* 1211, Prov. Tonkin (Tongking), French Indo-China, Nov., 1922 (Par.); *idem* (similiter) 1211, edges of roads, Cho Ganh, French Indo-China, Nov., 1923 (Calif.); *Rainier-Kesslitz*, borders of fields, Nagasaki, Japan, July, 1886 (Mus. V.); *M. L. Ramos*, Prov. Ilocos Norte, Luzon, Philippine Isls., March 8, 1909 (Man.); *idem*, Dupax, Prov. Nueva Vizcaya, Luzon, May 16, 1909 (Man.); *idem*, alt. 700 meters, Umuguten, Prov. Nueva Vizcaya, Luzon, May 18, 1909 (Man.); *idem* 30167, Catanduanes, Philippine Isls., November 14–December 11, 1917 (Mo.); *Rautaner* 75, Olukonda, Amboland, German Southwest Africa, April 30, 1894 (Kew; U.V.); *K. & L. Reckinger* 3636, Herbertshöhe, New Britain (Neu Pommern), Bismarck Archipelago, September, 1905 (Mus. V.); *C. B. Robinson* 31, rocky soil, alt. 10 meters, Batoe-mera, Amboina, Molucca Isls., July 20, 1913 (Man.); *idem* 9177, Polillo, Philippine Isls., August, 1909 (Man.); *F. A. Rogers* 8048, alt. 1,200 meters, Broken Hill, northwestern Rhodesia, May, 1908 (Kew); *idem* 25123, alt. 1,500 meters, Premier Mine, Pretoria, Transvaal (Kew; forma *B. bipinnatae* adpropinquans, forsan hybrida?); *Royle* 171, Cashmere (Kashmir; Cachemire), India, 1833 (Del.); *Miss E. M. Saunders*, Punjab, India (Kew); *Savatier* 621, wet, shady places, Yokoska, Japan, 1866–1874 (Kew; Par.); *Otto Scheerer*, Luakan, near Baguio, Prov. Benguet, Luzon, Philippine Isls., April, 1913 (Man.);[1] *A. K. Schindler* 210*a*, Tsingtau, Prov. Shan-tung, China, September, 1907 (Berl.); *idem* 247, eodem loco et tempore (Berl.; Del.; Mus. V.); *R. Schlechter* 4568, alt. 800 meters,

[1] Called Angguat by the Ibalai Igorot of Benguet; it "serves them to ferment the half-boiled grains of rice in making rice-wine, or 'tafei'" (fide Scheereri).

BIDENS PILOSA var. ALAUSENSIS f. SCANDICINA (H.B.K.) Sherff

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in shrubby place near Mailas Kopje, Transvaal, March 4, 1894 (Berl., 2 sheets; Boiss.; Kew; Mus. V.; U.V.); *idem* 17523, Kaiser Wilhelm's Land, April 8, 1908 (Calif.); *R. Schomburgh* 161, Port Darwin, North Australia (Kew); *Schottmueller* 219, Yokohama, Japan, October, 1860 (Berl.); *idem* 445, Dutch East Indies, January, 1862 (Berl.); *G. Schweinfurth* 296, Tamarida, Sokotra (Socotra), September 13, 1881 (Kew); *idem* 461, alt. 500 meters, Gebel Bura, Arabia, January 5, 1889 (Boiss.); *idem* 2240, forest thicket (Waldegebusch) at Gurfala, Bongoland, southern Sudan, August 2, 1869 (Berl.; Kew); *B. Seemann* 270 p.p., Fiji Isls., 1860 (Boiss.); *Gomes da Silva* 198, Timor, East Indies (Berl.); *George Staunton*, Prov. Chekiang, etc., eastern China (Brit.); *Stuhlmann* 2908, alt. 50 meters, Amboni, Distr. Usambara, German East Africa, June 24, 1893 (Berl., 2 sheets); *idem* 8529, Dar-es-Salaam, German East Africa, September 10, 1894 (Berl.); *Talmy*, Cochin-China, October, 1867 (Par.); *Emile Joseph Taquet* 969, in uncultivated places, Hongno, Isl. Quelpaert, Corea, September 23, 1908 (type collection of *Bidens Robertianaefolia* Lévl. & Vant.; Berl.; Del.); *A. J. Teague* 412, Odarvhi River Valley, Distr. Manica, Div. Umtali, Southern Rhodesia, 1915 (Kew); *G. Thomson* 58, Singapore, Malay Peninsula (Kew); *Thomas Thomson*, alt. 1,500–2,100 meters, northwest Himalaya, India (Brit.; Del.; U.V.); *idem*, Muradabad (Moradabad), India, 1845 (Kew); *Clovis Thorel* 1270, Bassac, etc., Cambodia, French Indo-China, 1862–1866 (Par.); *Thwaites*, Ceylon (Brit.); *Diomède Tuezkiewicz* 3118, vineyards at Le Vigan, southern France, August–September, 1859 (Gray); *Morice Vanoverbergh* 926, along roads, Subprov. Bontoc, Luzon, Philippine Isls., October 14, 1910 (Man.); *Nathaniel Wallich, Catalogue* No. 3189, *Comp.* No. 299*e*, Prome, India, 1826 (Berl., 2 sheets; Del., 2 sheets); *idem*, *Catalogue* No. 3189, *Comp.* No. 299*f*, Tavoy, India, 1827 (Berl.; Del.); *Warburg* 4381, alt. 600 meters, Java, January, 1887 (Berl.); *idem* 7850, Japan, September, 1887 (Berl.); *Welwitsch* 3961 and 3962, Angola (Kew); *idem* 3963, alt. 720–1,140 meters, Distr. Pungo Andongo, Angola (Brit.; Kew); *C. A. Wenzel* 302, in old clearings, Dagami, Leyte, Philippine Isls., July 3, 1913 (Del., 2 sheets; Field; Man.); ex *herb. Wightii* (*Wallich Cat.* No. 3189, *Comp.* No. 299*d*), alt. 1,050–1,200 meters, Dendygul Mts., India, 1830 (Berl.; Del.); ex *herb. Wightii* 1451 pro parte, mission garden, India, December, 1820 (Berl.; Kew, 2 sheets; N.Y.); *Capt. Wilkes*, Madeira, Madeira Isls. (N.Y.); *herb. Willdenowii* 15023-fol. 4 (Willd.);[1] *F. Wilms* 843, among bushes by the great waterfall,

[1] (Lecta, fide O. E. Schulzii op. cit. 178, a) *Klein*, Mgandamaley, Ceylon, February 29, 1796.

Distr. Lydenburg, Transvaal, February, 1890 (Berl.; Boiss.; Brit.; Del.; Kew; Mus. V.; U.V.); *idem* (similiter) 843, Lydenburg, Distr. Lydenburg, Transvaal, November, 1894 (Berl.; Mun.); *idem* 845 p.p., City Garden, eodem loco, February, 1884 (Berl.); *Hubert Winkler* 3376, southeastern Borneo, 1908 (Berl.); *J. M. Wood* 715, Inanda, Natal, May–June, 1880 (Kew); *Charles Wright* (*U. S. N. Pacif. Expl. Exped. under Ringgold & Rodgers*) 150, Loo-Choo Isls., Japan, 1853–1856 (Gray); *R. Yatabe*, Tokio, Japan, September 4, 1880 (Del.; nom. japonicum, sendangusa); *Yvan*, Isl. Chusan, Chusan Archipelago, China (Del.); *H. Zollinger* 410, in gardens, Java, June, 1856 (Mus. V.); *idem* 2284, Java (Berl., 2 sheets; Del., 3 sheets).

O. E. Schulz, in his special study of *Bidens chinensis* Willd. and related species (Bot. Jahrb. 50, Suppl. 178. 1914), appears to have overlooked the *Coreopsis biternata* of Loureiro, published with a description in 1790, some fourteen years earlier than the date of Willdenow's work. In view of the many difficulties involved in the interpretation of some of Loureiro's species, until recently I myself have refrained from attempting final disposition of his names. At last, however, these difficulties have been overcome and a certain and conclusive treatment becomes possible.

Loureiro described two species of *Bidens*, namely *B. pilosa* L. and *B. bipinnata* L., and two of *Coreopsis*, namely *C. leucorrhiza* Lour. and *C. biternata* Lour. The first two may be passed over, since they were admittedly not new species and since the known occurrence of these two species in the region mentioned by Loureiro (Cochin-China and China) tends to confirm the identity of the Loureiro plants. The third species, *Coreopsis leucorrhiza* Lour., has recently been referred (Bot. Gaz. 86: 443. 1928) to *Bidens pilosa* var. *minor* (Bl.) Sherff.

The fourth species, *C. biternata* Lour., was known to Loureiro under the Annamese dialectic name *Ca ap chioc*,[1] and he stated that

[1] Loureiro "lived at Hue for approximately thirty-five years, this town being the ancient capital of the kingdom of Cochin China, now a part of French Indo-China. I assume that the limits of the old kingdom of Cochin China were approximately the limits of the Province of Annam Anam, to-day, in French Indo-China. On leaving Hue, Loureiro proceeded to Canton and spent two or three years there before proceeding to Lisbon. . . . Loureiro tried to indicate in his native names as between Annamese (indicated by the letter 'a') and Chinese names (really in Mandarin) by the letter 'b'. . . by China he means the general vicinity of Canton in Kwangtung Province. . . . Generally speaking: I am of the opinion that most of his work was done on Cochin China specimens, chiefly for the reason that he resided so long in Cochin China and for a comparatively brief time in Canton; and the conditions in Canton at the time of his visit were such that it would have been impossible for him to visit any regions outside of the immediate vicinity of the city". . . . Dr. Elmer D. Merrill in lit. April 22, 1929.

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it grew in fields near Canton, China. His description follows: "Differ. spec. Cor. foliis biternatis, ovato-lanceolatis, serratis: panicula diffusa: radio sexfloro. Habitus et notae. Caulis herbaceus, 3-pedalis, erectus, 4-gonus, 4-sulcatus, integre luteus: panicula sparsa, terminali. Radii corollae 6, neutrae. Pappus bicornis, ramosus. Receptaculum planisculum, nudum."

His character for the foliage, *biternatis*, shows at once that he was dealing with the same plant that Willdenow treated under the name *Bidens chinensis*. His "pappus bicornis" was doubtless merely one of the numerous errors for which his descriptions were noted.[1] His "receptaculum . . . . nudum" probably was based upon capitula that had shed their achenes and chaff scales, for just previously, in his generic description of *Coreopsis*, he had said "recept. paleaceum."

In my monographic study of *Bidens*, I have found a considerable number of specimens from the general region traversed by Loureiro which are listed among the foregoing "Specimens examined."[2]

Recently I was supplied by Dr. Elmer D. Merrill with an excerpt from the manuscript of his "A Commentary on Loureiro's Flora Cochinchinensis" (since published; vide Trans. Amer. Phil. Soc. n. ser. 24: 391. 1935). Merrill, too, had concluded *Coreopsis biternata* Lour. to be the same as *Bidens chinensis* Willd. Since then, he has assisted with various desired data and has recently joined me in publishing the new combination which this conclusion made necessary.

In a former article (Bot. Gaz. 61: 499. 1916) I have remarked upon the good historical summary for this species, with a comprehensive list of synonyms, presented by O. E. Schulz (Bot. Jahrb. 50. Suppl.: 176. 1914). It is seen that the history of *B. biternata* goes back as far as Plukenet's *Phytographia* of 1691. Plukenet's plant had been received from D. Petiver, to whom it had been brought from China. The illustration later presented by Dillenius (Bidens latifolia hirsutior, semine angustiore, radiato—Hort. Eltham. 51, *pl. 43*. 1732) was deceivingly like *B. biternata*, although with leaves somewhat narrower. The plant of the Dillenian Herbarium at Oxford ("no. 43.51.51") is found to be really *Bidens pilosa* L., however, and so the Dillenian name must be excluded from synonymy.[3]

[1] Occasionally the pappus is *tricornis* and it may very well be that he had so spelled the word on sending it to the printer for the first edition. In any case this error was not corrected in the second edition.

[2] These mostly bear my herbarium determination, *Bidens chinensis* Willd. or, incorrectly as to Linnaeus (see discussion in text), (L.) Willd.

[3] In August, 1924, I examined Dillenius' plant at Oxford very carefully. The two somewhat *biternata*-like leaves which, in the illustration, had caused O. E. Schulz, myself, and others to refer the Dillenian plate to *B. biternata* (or its syn-

The Rumphius plate, showing an entire fruiting plant from Amboina, or a neighboring island, is very good and matches precisely, in its individual aspect, many of the plants collected in that general region in recent years. Varietally, however, it might profitably be regarded as different from much of the *B. biternata* in other parts of the Eastern Hemisphere, were there not here so many intergradations as to make varietal distinctions in probably all cases, except for var. *glabrata*, impossible. We may add that Rumphius' plate is particularly important because it is directly to that plate that Willdenow's two synonyms lead (Willdenow did not cite *B. pilosa* var. *chinensis* L. as a synonym!).

In several hundred herbarium determinations I have unfortunately followed O. E. Schulz in appending "(L.) Willd." to the name there used (*B. chinensis*). As even Schulz admitted, the varietal name as first published by Linnaeus in the *Mantissa* (p. 281. 1771) was based upon cultivated material, which, from the Linnean description, was doubtless *B. pilosa* var. *minor* Sherff. The Linnean Herbarium has several sheets pinned together in the *Bidens pilosa* cover. One is labeled "Bidens 5 pilosa"; a second, "Bidens pilosa variety"; a third, "HU Radio albo"; a fourth has on its back, "Rumph. amb. 6 t. 15." This fourth sheet has a plant with five heads, two of them fruiting, and a separate leaf at one side. The leaf is 5-partite, with the two basal leaflets each 2-partite because of an ovate leaflet on the lower side. Examination of this material in 1914 and again in 1924 convinced me that this fourth sheet is of a merely freakish form of *B. pilosa* var. *minor*, and not *B. chinensis* Willd. Hence Linnaeus' name may well be left out of consideration here, and Willdenow, who fortunately cited only the *Systema Vegetabilium* (ed. 13, p.) 610[1] for his basis, may properly be given sole credit.

As stated previously (Bot. Gaz. loc. cit.), the figure in Plukenet's *Phytographia* was cited by Tausch (Flora 19: 395. 1836) for his *Bidens Cicutaefolia*. A study of his context (some of which, unfortunately, was not included in the manuscript copy before me at the previous writing) shows that Tausch primarily was describing several species of *Bidens* cultivated in gardens under the name of *B. bipinnata* and that then, in the case of his *B. Cicutaefolia*, he added the Plukenet reference. Under these circumstances, the Plukenet reference may

onym, *B. chinensis*), were detached from the main specimen and might have belonged to another specimen. At any rate, the main specimen was very clearly and positively *Bidens pilosa* L.

[1] A work that omits Linnaeus' varietal name *chinensis* published three years earlier and rests the variety directly upon Rumphius' *Agrimonia molucca*.

BIDENS PILOSA var. CALCICOLA (Greenm.) Sherff (figs. *a*, *c–j*); f. DISSECTA Sherff (fig. *b*)
BIDENS AEQUISQUAMA (Fern.) Sherff (figs. *k–t*)

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properly be discarded and Tausch's description itself,[1] which conflicts with *B. biternata* as to achenes, be used instead. This course led me some time ago to the conclusion that Tausch's *B. Cicutaefolia* was probably a mere form of *B. bipinnata* L., a conclusion since confirmed by examination of Tausch's own specimen (cult.) of *B. Cicutaefolia* (Lps.).

The species *B. biternata* is usually distinguished easily from typical *B. pilosa* by the leaves, the lower leaflets in the former commonly being tripartite, not simple. The external involucral bracts and the achenes also are usually distinct.

Gaudichaud's *B. peduncularis*, collected on Freycinet's voyage, at the Island of Rawak of the Molucca Islands, is *B. biternata*. It is of interest as having come from the same group of islands as Rumphius' *Agrimonia molucca*.[2] All through that region *B. biternata* is common.

Miquel (Fl. Nederl. 2: 78. 1856) refers *Agrimonia molucca* Rumph. to *B. peduncularis* Gaud. "(nisi ad praec. β. [i.e., *B. Wallichii* var. *bimensis* Miq.])." It is true that Miquel erroneously equated *B. sandvicensis* Less. with *B. peduncularis* Gaud. but in this he doubtless was merely following DeCandolle's earlier treatment (Prodr. 5: 598. 1836). Interesting it is, then, to find that as early as 1856 Miquel had come almost to the point of synonymizing the two names of Moluccan plants with each other and with *B. Wallichii* DC.

Of *Bidens Wallichii* DC. many authentic specimens are extant today and they all are seen to be very definitely *B. biternata*. Thus, for example, six uniform sheets of material occur in Berlin (Berl.). These were collected by Wight, Prone, Tavoy, etc., and all are *B. biternata*. They all are of the old Wallich distribution No. 3189, cited by DeCandolle for his *B. Wallichii*. C. B. Clarke (Compos. Ind. 141. 1876) reduced *B. Wallichii* to a variety of *B. pilosa* L. but later, on a herbarium sheet in Kew Herbarium, admitted his error in so doing.[3]

B. Wallichii var. *bimensis* Miq. was described from a specimen collected by Rheinwardt on the Island of Bima, considerably to the

[1] "Foliis bipinnatisectis glabris, laciniis ovatis dentatis, caule stricto, floribus corymbosis subradiatis, involucro appresso, achaeniis erectis 2-aristatis."

[2] For further data see under *B. sandvicensis* Less. (p. 123, footnote 1).

[3] On the herbarium label for *H. Collett* 816, Clarke wrote, "I erred about these two Indian *Bidens* ([sic] in my Comp. Indicae) and Sir J. D. H[ooker] unfortunately 'followed' me.

"*Bidens pilosa* Linn. is *B. leucantha* Willd. and has the ray *white*. *B. Wallichii* DC. has the ray *yellow* (and smaller) as well as different leaves and is a good species. C. B. Clarke. 11 May 1894."

southwest of the Molucca Islands. From its description,[1] it appears to differ in no important respect from ordinary *B. biternata.*

B. chinensis f. *simplicifolia* O. E. Schulz was based on Henry's No. 388 from the Province of Hupeh, China. It is merely a small, poorly developed form. The leaves are simple, as happens also in *B. pilosa, B. tripartita,* and many other similar species when the growth conditions are poor. One may well doubt the wisdom of assigning indiscriminately to formal or varietal rank the many impoverished or otherwise retarded forms of this nature that are found repeatedly among herbarium specimens.[2]

Bidens pinnata Noronha (Verh. Batav. Gen. 5 [ed. 1.] Art. IV[?] 8. 1790) is listed without description but with the Java synonym Harrugà. It probably was either *B. biternata* or *B. pilosa* var. *minor,* both of these plants being known in Java, probably without distinction, under the name Harrugà.

Léveillé (loc. cit.) cited as the type for *B. Robertianaefolia* Lévl. & Vant., a plant collected in Corea by Taquet: Island of Quelpaert, in uncultivated places at Hongno, September 23, 1908. There exist fine specimens with these data in Geneva and Berlin (Taquet 969, Del.; Berl.). They are *B. biternata.*

Plants by Bretschneider, David, etc., from the neighborhood of Peking, China, display a remarkable approach or transition through their more decompound and membranaceous leaves and their frequently narrower and fewer-flowered heads to *B. bipinnata* L. (or are even suggestive of the North American *B. Bigelovii* Gray and *B. leptocephala* Sherff). A slightly similar approach is made rarely by plants collected elsewhere (e.g., *Macgillivray* 63, Lizard Isl.).

Bidens biternata var. *β.* **glabrata** (Vatke) Sherff, Bot. Gaz. 90: 389. 1930.

Bidens abyssinica var. *glabrata* Vatke, Linnaea 39: 500. 1875.

Bidens pilosa var. *glabrata* Vatke ex Engler, Hochgebfl. Trop. Afr. 437. 1892.

Bidens lasiocarpa O. E. Schulz, Bot. Jahrb. 50, Suppl. 185. 1914.

Herba caule glabrata, 3–7 dm. alta. Folia tenuiter petiolata petiolis 1–4 cm. longis, petiolo adjecto 4–14 cm. longa, tripartita vel

[1] "Var. *β bimensis,* folia fere omnia 2–3-jugo-pinnatisecta, segmentis argute serratis et profunde incisis, hinc passim subpinnatifidis, achaenia ext. mediis multo breviora, radii pappi 3 vel saepe 2 vel 4 inaequales."

[2] The sheet of *Henry* 388 bears two specimens, the larger, second one having the leaves tripartite and resembling those of *B. cylindrica* Sherff.

rarius quinquepartita rarius bipinnata; foliolis plus minusve glabris, ovato-lanceolatis, serratis vel crenato-dentatis vel crenato-incisis, membranaceis. Capitula corymbosa, subradiata, ad anthesin 4–6 mm. alta et 4–8 mm. lata, demum 1.8–2.6 cm. alta et 1.5–2.5 cm. lata, pedunculata pedunculis tenuibus crassisve et 4–12 cm. longis. Involucrum plus minusve pilosum; bracteis plerumque subaequalibus demum 6–11 mm. longis, exterioribus (6–9) anguste linearibus ciliatisque rarius interiores multo superantibus. Flores ligulati perpauci (2 vel 3), minuti, subalbidi, saepe deficientes. Flores disci plerumque ad apicem quadridentati, rarius quinquedentati. Achaenia linearia, recta vel moderate recurvata, nigra, tetragona; exteriora scabrido-hispida, rarius 4- plerumque 3-aristata, 7–14 mm. longa; interiora elongata, plerumque 4-, rariter 3–6-aristata, corpore usque ad 2.5 cm. longa; aristis retrorsum hamosis, 2–4 mm. longis.

Type specimen: Collected by *Wilhelm Schimper*, No. 105, in Abyssinia, 1854.[1]

Distribution: Widely and sparingly scattered in Japan, Corea, northeastern China (Province of Shan-tung), British East India, Arabian Peninsula (Yémen); in Africa from Abyssinia, where especially common, Egypt, Dar Fur, and Nigeria southward intermittently to Natal and German Southwest Africa; also islands of Borneo, Réunion, Cape Verde, etc. Much less common than the species proper and than its own f. *abyssinica*.

Specimens examined:[2] *Andrea Bellini* 330, Eritrea, October 30, 1910 (Flor.); (*Emilio Chiovenda* 1120 and 1539*bis*, both from Gondar,

[1] Vatke (loc. cit.) states: "Adest in coll. a. 1854 n. 105. e Gaha Meda prope Dschadscha, a Schweinfurthio Beitr. 142 cum var. altera (*quadriaristata* Hochst. fide ejusdam) n. 305 e Gageros confusa, a qua primo intuitu diversissima; nostra transitum praebere videtur ad *B. bipinnatum* L. a Kotschyo in Nubia repertum, cui forte stirps abyssinica reducenda." The Berlin Herbarium has three sheets of *Schimper* 105, but my manuscript gives these as from alt. 1,200–1,500 meters, Gageros, Abyssinia, September 16, 1854. On the other hand, the several specimens of *Schimper* 305 studied (vide sub f. *abyssinica*) were noted as coming from Gaha-Meda near Dschadscha, Abyssinia, October 22, 1854. My manuscript does not differentiate for these Nos. 105 and 305 the var. *glabrata* or its f. *abyssinica*.

[2] In addition to the specimens here cited may be given the following, which belong either to the variety *glabrata* or to its f. *abyssinica* but which had been studied before it was decided to differentiate the two forms: *J. T. Bent*, alt. 900–1,200 meters, seacoast of Nubia at about 21° N. Lat., 1896 (Kew); *Boivin*, Isl. Bourbon (Kew); *Botta*, Yémen, Asiatic Turkey (Arabian Peninsula), 1837 (Par.); *J. Cardoso* 103, Cape Verde Isls., 1895 (Kew); *W. R. Carles* 219, Chemulpo, Corea (Kew); *C. B. Clarke* 21969*B*, Patankot (Pathankote), India, September 9, 1874 (Webb); *N. H. Cowdry* 894, roadside, moist locality, Che-foo, July, 1920 (Kew); *idem* 896, north end of sand spit, Che-foo (Chi-fu), Prov. Shan-tung, China, August 6, 1920 (Kew); *Deflers* 231, alt. 1,200 meters, Wadi Hidjan, Usil, Yémen, Asiatic Turkey (Arabian Peninsula), May 6, 1887 (Boiss.); *idem* 428, alt. 1,900 meters, Wadi Schidja, Menakha, Yémen, May 16, 1887 (Boiss.); *DeWitte* 2118, tropical East Africa, November 27, 1934 (Bruss.); *F. V. Dickins* 652, Yokohama, Japan,

Dembià, Prov. Amhara, Abyssinia, were formerly referred here; they are the f. *abyssinica;*) *E. Chiovenda* 1234, Gondar, July 30, 1909 (Flor.); *idem* 1834, Dembià, September 3, 1909 (Flor.); *idem* 2161, Abyssinia, September 20, 1909 (Flor.; sub nom. *B. abyssinica* var. *glabrata* f. *nemorali*); *idem* 2409, Gondar, October 7, 1909 (Flor.); (*Adriano Fiori* 1832 and 1833, both collected in Eritrea, January, 1909, were formerly referred here but on reexamination are seen to be the f. *abyssinica;*) *Adriano Fiori* 1834, alt. 2,330 meters, Asmara, Eritrea,

commun. May, 1876 (Kew); *W. J. Dowson* 194, Nairobi, British East Africa (Kew); *J. F. Duthie* 3054, alt. 2,400–2,700 meters, Kali Valley, Kumaon (Kumaun), northwestern India, September 16, (1886?; Boiss.); *Bertha Fritzsche* 93, grassy plains, Humpata, Angola, May, 1903 (Berl.); *Miss A. E. Gairdner* 577, Sesheki District, Rhodesia, April (Kew); *John Gossweiler* 5438, Angola, January 28, 1912 (Brit.); *J. M. Hildebrandt* 415, alt. 1,500 meters, under bushes, Habab, Abyssinia, September, 1872 (Mus. V., 2 sheets); *V. Jacquemont* 879′, India (Par., 3 sheets); *idem* 884′ and 886, eodem loco (Par.); Kotschy 79, along pools of rain water at eastern foot of Mt. Arasch-Cool, Nubia (Kordofan), September 30, 1839 (Kew); *idem* 135, in wet places near Arasch-Cool, Nubia, August, 1837 (Kew; Mus. V.); *idem* 325, Nile River near Sennar, Khartum region, 1837 (vide p. 405; Coss.; Mus. V.; forma foliorum lobis acrioribus et a Schz. Bipont. ipso *Bidens laciniata* dicta); *Krauss* 11, Port Natal, Natal, 1840 (Del.; Kew); *H. V. Lely* 267, Neill's Valley, east of Naraguta Government Station, Nigeria, June 15, 1921 (Kew); *idem* 600, Kadaura, northern Nigeria, September 19, 1921 (Kew, 2 sheets); *H. Lynes* 609, alt. 1,080 meters, Kulme, Dar-Fur Prov., Sudan, September 27, 1921 (Kew); *D. T. MacDougal & G. Sykes* 134, alt. 780 meters, northern Africa, January 25, 1912 (Brit.); *R. E. Massey* 60, Gondar and vicinity, Abyssinia (Kew); *Maximowicz, iter secundum*, Yokohama, Japan, 1862 (Berl.; Flor.; Gray; Kew; Mun.; Mus. V.); *Richard Oldham* 411 pro parte, Nagasaki, Japan, 1862 (Berl.; Cop.; Del.; Flor.; Mun.; Mus. V.; Par., etc.; pro parte parva cum *B. tripartita* commixta); *Petit*, Abyssinia (Berl., 2 sheets); *Pfund* 204, Katul Gambar, northeastern Africa, September 8, 1895 (Kew); *Quartin-Dillon*, Memsa, Abyssinia (Par.); *idem & Petit*, eodem loco (Par.); *Rohr* 55, Abyssinia, April, 1842 (Kew); *W. Schimper* 196, Abyssinia (Berl.); *idem* 285 and 288, alt. 1,800 meters, Scholloda, Prov. Tigre, Abyssinia, September 24, 1862 (Berl.; Brit.; "Landplage für wanderer vom October bis Januar weil sich die Früchte in die Kleider einstechten"); *idem* 305, alt. 1,800 meters, Gaha-Meda near Dschadscha, Abyssinia, October 22, 1854 (Berl., 2 sheets; Del.; Mus. V.); *idem* 321, Abyssinia, October, 1841 (Berl.); *idem* 337 (type, Par.: cotypes, Berl., 2 sheets; Brit.; Del., 3 sheets; Hamb.; Kew, 3 sheets; Mo.; Mun.; Mus. V.; U.V.; nom. abyssinicum, Zellim Tannag); *idem* 912, Abyssinia, October 10, 1852 (Par., 4 sheets); *idem* 1427, everywhere near Djeladjeranne, Abyssinia, September 20, 1840 (Berl.; Del., 3 sheets; Kew, 3 sheets; Kiel; Mo.; Mun., 2 sheets; Mus. V.; Par.); *idem* 1475, alt. 1,500 meters, on mountains, Dscha-Dscha, Abyssinia, September 28, 1854 (Del.; Mus. V.; U.V.); *idem* (similiter) 1475, eodem loco, August 22, 1853 (Par., 3 sheets); *idem* 1986, near Djeladjeranne (Par.); *idem* 2181, alt. 1,500 meters, mountains near Dschadscha, September 28, 1854 (Brit.; Del.; Gray; Kew; Mus. V., 3 sheets); *idem* 2324, alt. 1,200 meters, mountains prope Gageros, Abyssinia, September 16, 1854 (Brit.; Del.; Kew; Mus. V., 3 sheets; sub nom. var. *incisifolia*); *C. Schultz Bipontinus*, cultivated, December 6, 1856 (Del.); *G. Schweinfurth* 419 p.p., Kanka, near Cairo, Egypt, September 25, 1864 (Brit.); *idem* 420, Matamma, Abyssinia, October 6, 1865 (Berl., 2 sheets; Brit.; Kew; Mus. V.); *idem* 1619 and 1643, upper lava valley, Eritrea, 1891 (Boiss.); *idem & D. Riva* 458, Mt. Farakh near, and 477 at Ailet, Eritrea, February 18, 1892 (Boiss.); *F. Seiner* 509, alt. 1,350 meters, German Southwest Africa, April 14, 1911 (Berl.); *Stocks* 608, Distr. Scinde, India (type of *Bidens lasiocarpa* O. E. Schz., Berl); *Thwaites* 3583, Ceylon (Mus. V.); *U. S. S. Pacif. Expl. Exped.* under *Capt. Wilkes*, Cape Verde Isls., 1838–1842 (Phila.); *Wight* 1606, India (Berl.; Cop.; Kew; Mus. V.).

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Nov. 15, 1909 (Flor.); *Giovanni Negri* 667, alt. about 1,900 meters, Scioa, June 17, 1909 (Flor.); *A. Pappi* 821, alt. about 2,480 meters, Altipiano di Gheleba, Scimenzana, Eritrea, September 22, 1902 (Flor.); *idem* 3040, alt. about 500 meters, Assaorta Cuale-Enrot, Eritrea, March 18, 1893 (Flor.); *idem* 4128, alt. about 600 meters, Valle Damas, Oculé Cusai, Eritrea, April 14, 1893 (Flor.); *idem* 6011, Monte Damba, Beni-Amer, Eritrea, September 10–25, 1903 (Flor.); *idem* 7252, altitude about 1,600 meters, Adi Ghebsus, Medri Od Tesfa, Eritrea, November 2, 1906 (Flor.); *idem* 7680, alt. 800 meters, along the Gherhen River, Beni Amer, Eritrea, October 1, 1907 (Flor.); *idem* 8524, alt. about 1,326 meters, Beggiuch, near Adi Mendad, Bogos, Eritrea, September 29, 1909 (Flor.); *G. Schweinfurth & D. Riva* 804, alt. 2,200 meters, environs of Saganeiti, Eritrea, March 7, 1892 (Boiss.); *A. Tellini* 292, Altipiano-Asmara, Eritrea, October 1–10, 1903 (Flor.).

In proposing as a new species his *Bidens lasiocarpa*, Schulz emphasized (in key, op. cit. 87) the fact that the outer achenes are more or less recurved and commonly very densely hirtous, but this character is present equally well in the type material of *B. biternata* var. *glabrata* and its f. *abyssinica*, where it seems to have been overlooked by him. Moreover, *B. lasiocarpa* has long achenes, as in the type material of var. *glabrata* and, as a whole, is too closely connected by intermediate forms in the herbaria to rank as a separate species. *B. lasiocarpa* appears to bear somewhat the same relationship to the var. *glabrata* as is borne by the peculiar local form found about Peking, China, cited under the species proper, to the species itself. In both cases there is a gradation of the foliage toward the more membranaceous and more decompound type possessed by *Bidens bipinnata* L.

Bidens biternata var. **glabrata** f. 1. **abyssinica** (Schz. Bip.) Sherff, Bot. Gaz. 90: 389. Pl. C.

Bidens abyssinica Schz. Bip. in Walp. Repert. 6: 167. 1846–1847.

Bidens abyssinica var. *quadriaristata* Hochst. ex Schweinfurth, Beitr. Fl. Aethiop. 142. 1867 (nomen subnudum).

Bidens laciniata Schz. Bip. ex Schweinf. op. cit. 283 (nomen).

Bidens quadriseta Hochst. ex Oliv. & H. in Oliver, Fl. Trop. Afr. 3: 393. 1877.

Bidens abyssinica var. *incisifolia* Hochst. loc. cit. (nomen nudum).

Bidens pilosa var. *quadriseta* (Hochst.) Schweinf. ex Engler, Hochgebirgsfl. Trop. Afr. 437. 1892.

Bidens pilosa var. *abyssinica* (Schz. Bip.) Fiori, Nuov. Giorn. Bot. Ital. n. ser. 20: 390. 1913.

Bidens chinensis var. *abyssinica* (Schz. Bip.) O. E. Schulz, Bot. Jahrb. 50, Suppl. 180. 1914.

A var. *glabrata* caule piloso tomentoso-hirtove foliolis dense tomentoso-pilosis vel subhirtis involucro plerumque dense hirto differt.

Type specimen: Collected by *Wilhelm Schimper*, No. 337, in stony places on the mountains and in the valleys near Adowa (Adoa) and everywhere in front of Djeladjeranne (Tchélatchékanné fide *A. Richardii*, Tent. Fl. Abyssin. 1: 414, 415, etc., 1847; etiam Dscheladscheranne), Abyssinia, September 19, 1837 (Par.).

Distribution: With the var. *glabrata* and much more common.

Specimens examined:[1] *Chiovenda* 1120, Gondar, Prov. Amhara, Abyssinia, July 26, 1909 (Flor.); *idem* 1539*bis*, eodem loco, August 21, 1909 (Flor.); *Adriano Fiori* 1832, alt. 960 meters, Ghinda, Hamasen region, Eritrea, January 14, 1909 (Flor.); *idem* 1833, Damas, Eritrea, January 13, 1909 (Flor.); *A. Pappi* 6105, along the Mai Albo, Dembelas, Eritrea, September 25, 1903 (Flor.); *Schimper* 337 (type, Par.: cotypes, Berl., 2 sheets; Brit.; Del., 2 sheets; Kew, 3 sheets; Mo.; Mun.; Mus. V.; U.V.).

Some of Schimper's original specimens, on which were founded the names *Bidens abyssinica*, *B. abyssinica* var. *quadriaristata*, and *B. quadriseta*, are densely hairy forms with tripartite leaves and conspicuously large fruiting heads. In leaf characters they might be confused with *B. pilosa* L.; their achenes and involucral bracts, however, are very distinct. Some cotypes of "*B. abyssinica*" (Brit., etc.) show leaves more incisely toothed or lobed and approaching more or less closely those of *B. biternata* proper. The fruit characters sometimes seem too distinctive to warrant reducing "*B. abyssinica*" to subordinate rank under *B. biternata* as proposed by O. E. Schulz, but the great number of intergradations observed in various herbarium specimens appears to compel some such course.

The varietal name *incisifolia* was given originally to specimens of *Schimper* 2328, described (Oliver, loc. cit.) as having "rather more deeply cut lobes." The authentic sheet of this number at Kew, however, marked "Fl. Afr. Trop. iii p. 393," has none of its leaves incisely toothed to a noticeable degree.

[1] Here belong also the majority of the specimens which are cited on p. 401, footnote 2.

BIDENS DOMINGENSIS O. E. Schulz

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B. abyssinica var. *quadriaristata* Hochst. ex Schweinf. was published without description, but based upon *W. Schimper* 729, ad Gageros, September 16, 1854, etc. I have not seen this number, but the data given by Schweinfurth are essentially the same as those for *Schimper* 105 and 2324 already cited. Oliver and Hiern (in Oliv. loc. cit.) cited this varietal name as a synonym for *Bidens quadriseta*, but of course did not thus validate it as a varietal name, nor did the varietal nomen *incisifolia* receive valid publication.

Bidens laciniata Schz. Bip. ex Schweinf. was a nomen applied to *Kotschy* 325. The material in Schultz Bipontinus' private herbarium (Par.) had been received from the Vienna Botanical Garden. This and also the more ample specimen in Vienna (Mus. V.) are the f. *abyssinica*.

EXPLANATION OF PLATE XCIX, FIGS. *a*, *c–m*

Bidens biternata: *a*, flowering and fruiting specimen, ×0.7; *c*, exterior involucral bract, ×4.91; *d*, interior involucral bract, ×4.91; *e*, *f* with *g*, *h*, ray florets (*h* having rudiments in throat), ×4.91; *i*, palea, ×4.91; *j*, disc floret, ×4.91; *k*, *l*, *m*, achenes, ×4.21; *a*, *c–g*, *i–k*, from *Wenzel* 302, in Hb. Field; *h*, *l*, *m*, from *Clarke* 22374, in Hb. Brit.

EXPLANATION OF PLATE C

Bidens biternata var. *glabrata* f. *abyssinica:* *a* (lower), *b* (upper), portions of fruiting plant, ×0.65; *c*, exterior involucral bract, ×2.6; *d*, interior involucral bract, ×2.6; *e*, palea, ×2.6; *f*, disc floret (4-lobed), ×2.6; *g* (outer), *h* (inner), achenes, ×1.95; *a–e*, *g*, *h*, from *Schimper* 2181 (*Bidens quadriseta* Hochst.), in Hb. Kew; *f*, from *Schimper* 2324, *ibid.*

127. **Bidens Engleri** O. E. Schulz, Bot. Jahrb. 50, Suppl. 186. 1914. Pl. XCI, figs. *a–f*.

Herba gracilis, erecta, 2–3 dm. alta; caule tetragono, glabro, ramoso, 1.5–2 mm. diametro. Folia petiolata petiolis tenuibus 1–4 cm. longis, petiolo adjecto principalia 3.5–10 cm. longa, plerumque simplicia et ovato-lanceolata, membranacea, serrata dentibus acriter apiculatis, margine ciliata, faciebus glabrata vel sparsissime adpresso-pilosa. Capitula ramos tenues plerumque nudos usque ad 8 cm. longos terminantia, discoidea, ad anthesin 2.5–5 mm. alta et 2.5–4.5 mm. lata. Involucri bracteae exteriores 3–5, lineares, apicem versus dilatatae, apice acutae, margine serrato-ciliatae, faciebus glabrae vel hispidae, 1–2 mm. longae et 0.3–0.6 mm. latae; interiores lanceolatae, apice rotundato-obtusae vel subacutae, multo longiores.

Achaenia anguste oblongo-linearia, obcompressa, subtetragona, atra, glabra, omnino circ. 8-sulcata, corpore 1.2–1.6 cm. longa et circ. 1 mm. lata, bi- vel triaristata[1] aristis tenuibus, retrorsum hamosis, 2.5–4 mm. longis.

Type specimen: Collected by *Georg Schweinfurth*, No. 2596,[2] in forest called Genena, near Seriba Ghattas, District of Jur (Djur), Province of Bahr-el-Ghazal, English–Egyptian Sudan, November 8, 1869 (Berl.).

Distribution: Known only from type locality in Province of Bahr-el-Ghazal, English–Egyptian Sudan.

Specimens examined: *Schweinfurth* 2596 (type, Berl.: cotypes, Boiss.; Mun.; Mus. V.; Par.).

An African species comparable to *Bidens tenera* of northern South America. The plants of the type collection all are less than 3 dm. high, and practically all the leaves are undivided. Hispid outer achenes are lacking and the exterior involucral bracts are mostly about 3 or 4 in number, 1–2 mm. long and spatulate, with the margin, except near the base, minutely serrate. The achenes, which tend to be rather parallel-sided throughout their length and hence oblong-linear, are unique in appearance.

With *B. Engleri* Schulz identified an apparently different form, *Chevalier* 2816, here referred to *B. cylindrica* Sherff.

EXPLANATION OF PLATE XCI, FIGS. *a–f*

Bidens Engleri: a, entire flowering and fruiting plant, ×0.6; *b*, exterior involucral bract, ×6; *c*, interior involucral bract, ×6; *d*, palea, ×6; *e*, disc floret, ×6; *f*, achene, ×2.4; all from type.

128. **Bidens tenera** O. E. Schulz, Bot. Jahrb. 50, Suppl. 186. 1914. Pl. CIII, figs. *i–o*.

Involucri bracteae exteriores circ. 4; achaeniis 2–4- plerumque 3-aristatis ..... *B. tenera* sensu stricto.

Involucri bracteae exteriores circ. 7 vel 8; achaeniis normaliter 4-aristatis ..... var. *β. paucidentata*.

Herba annua, tenera, 1–3.5 dm. alta; caule tenui, tetragono, 0.75–1 mm. crasso, subglabro, simplici vel parce ramoso. Folia petiolata petiolis 1–3 cm. longis, petiolo adjecto 3–11 cm. longa,

[1] A search through three sheets of type and cotype material shows no achenes with "4" aristae as stated by Schulz, loc. cit.

[2] Erroneously given by Schulz, loc. cit., as 259*h*, because the type label had had the number carelessly inserted. Labels elsewhere give the number distinctly as 2596.

BIDENS MALMEI Sherff

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saepe simplicia, valde membranacea, ovata vel ovato-lanceolata, ad apicem acuminata vel interdum acuta, basi rotundata vel truncata, argute serrata dentibus plerumque mucronulatis, ciliata, supra setis brevibus sparsissime vestita (interdum principalia trifoliolata, foliolo terminali foliis simplicibus aequali, foliolis lateralibus moderate minoribus, ovatis, acutis, sessilibus, 1–2.5 cm. longis et 1–1.5 cm. latis; rarissime irregulariter quinquepartita). Capitula perpauca, non perspicua, discoidea, pauciflora 6–15 (vel etiam –20) floribus tubulosis, ad anthesin 3.5–5 mm. alta et 3–6 mm. lata. Involucri basis hispida; bracteis exterioribus circ. 4, late linearibus vel linearispathulatis, ad apicem subdilatatum obtusiusculis sed mucronulatis, breviter ciliatis praesertim basim versus, circ. 4 mm. longis, quam interioribus vix brevioribus. Achaenia linearia, nigra, recta vel vix recurvata, subtetragona vel obcompresso-tetragona, omnino circ. 8-sulcata, glabra, corpore 1.2–1.5 cm. longa, quam paleae multo longiora, 2–4- (plerumque 3-) aristata; aristis viridi-flavidis, retrorsum hamosis, 2–3 mm. longis.

Type specimen: Collected by *Henri François Pittier*, No. 4528, in forests of Boruca, Costa Rica, November, 1891 (Berl., 2 sheets).

Distribution: Costa Rica; Colombia eastward to French Guiana and southward to State of Minas Geraes, Brazil.

Specimens examined: *Burchell* 8848, tropical Brazil (Kew); *Nicholas Funck* 424, Minca, Dept. Magdalena, Colombia, November–December, 1842 (Boiss.; Kew; Mus. V.; Petrop.); *idem* 431, Caracas, Venezuela, 1843 (Del.; Par.; forma parce typica); *Gabriel*, French Guiana, 1802 (Del.); *George Gardner* 3849, shady banks of streams, Goyaz, Brazil, March, 1840 (Kew, 2 sheets); ex *Hort. Par.*, cult. (Del., sub. nom. *Ceratocephalo* Vaill.); *H. F. Pittier* 4528 (type, Berl., 2 sheets: cotypes, Brit.; Gray); *idem* 9140, Guaremales, Venezuela, December 10, 1920 (Del.; Gray; achaeniis vix typica); ex *herb. L. C. Richardii*, French Guiana (Par., sub nom. *Bidente trifoliolata*); *H. H. Smith* 512, alt. 150 meters, observed only in damp woods near river at Masinga, Santa Marta, Colombia, November, 1898–1901 (Berl.; Brit.; Carn.; Del.; Field; Kew; Mo.; N.Y.; Par.; Phila.); *Eugene Warming*, Picão, Minas Geraes, Brazil, January 26, 1865 (Cop., foliis 5-partitis); *idem* 643 pro parte, on calcareous rocks, Lagoa Santa, Minas Geraes, March 28, 1864 (Cop.).

A species with very delicate, membranaceous foliage, a character easily explained by the sylvan habitat. The peduncles are mostly very slender and the fruiting heads suggest those of *Bidens Engleri* O. E. Schulz.

Bidens tenera var. β. **paucidentata** (O. E. Schulz) Sherff, Bot. Gaz. 89: 362. 1930.

Bidens Ekmanii et var. *paucidentata* O. E. Schulz in Urban, Repert. Sp. Nov. 26: 111. 1929.

Bidens tenera var. *tetracera* Sherff, Bot. Gaz. 88: 293. 1929.

Capitula discoidea ad anthesin 4–5 mm. alta et pariter lata. Involucri bracteae exteriores circ. 7 vel 8, lineares, tergo fere glabrae, margine ciliatae, sub apice interdum subdilatatae, apice ipso subacutae, circ. 3 mm. longae; interiores lanceolatae, 4–5 mm. longae. Achaenia 15–30, linearia, fere usque ad apicem atra, apice ipso straminea, corpore tetragona atque 1–1.5 cm. longa, circ. 0.5–0.65 mm. crassa, superne sensim attenuata, glabra, unica facie (4 facierum) 2-sulcata, apice quadriaristata aristis tenuibus, 2–3 mm. longis, retrorsum hamis elongatis tenuibus albidis hamosis.

Type specimen: Collected by *Erik L. Ekman*, No. 10022, in Province of Oriente, Cuba (Stockh.).

Distribution: Known only from Cuba and Bolivia.

Specimens examined: *Otto Buchtien* 4182, alt. 1,300 meters, Milluguaya, North Yungas, Bolivia, December, 1917 (U.S., type of var. *tetracera* Sherff); *Ekman* 3398, on the forest path between Sabana Resusña and Sabana Niranda, Prov. Oriente, Cuba, November 5, 1914 (Stockh.; type of *Bidens Ekmanii* O. E. Schz.); *idem* 10022 (type, Stockh.); *H. Pittier* 10222, alt. 800–1,000 meters, around Caracas, Venezuela, March 10, 1922 (Gray; N.Y.; U.S.).

Differs from the species proper in its more numerous achenes, these quadriaristate and upwardly attenuated, not triaristate nor almost parallel-sided throughout. The general aspect is that of a thin-leaved form of *Bidens pilosa* L. as to foliage and of *B. bipinnata* L. as to fruiting heads.

Bidens tenera var. *tetracera*, published in November, 1929, was found to have been antedated several months by the equivalent *B. Ekmanii* O. E. Schulz and its so-called var. *paucidentata*, both of Cuba. The type specimens of *B. Ekmanii* and its var. *paucidentata* are now before me (through the kindness of Dr. Gunnar Samuelsson, Director of the Botanical Section of the Natural History Royal Museum of Stockholm). They differ mutually to an insignificant extent, nor are they separable from the South American specimens described for *B. tenera* var. *tetracera*.

EXPLANATION OF PLATE CIII, FIGS. *i–o*

Bidens tenera: *i*, entire small flowering and fruiting plant, ×0.7; *j*, tripartite leaf, ×0.7; *k*, exterior involucral bract, ×5.56; *l*, interior

BIDENS CYNAPIIFOLIA H.B.K.

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involucral bract, ×5.56; *m*, palea, ×5.56; *n*, disc floret, ×5.56; *o*, achene, ×3.48; *i*, *k–o*, from *H. H. Smith* 512, in Hb. Field; *j*, from cotype, in Hb. Gray.

129. **Bidens duranginensis** Sherff, Bot. Gaz. 70: 90. *pl. 11, figs. g–m.* 1920. Pl. XCVI, figs. *j–q*.

Bidens Anthriscoides var. *angustiloba* DC. Prodr. 5: 601. 1836.

Herba annua, glabrata, demum circ. 6–9 dm. alta; caule subtetragono, ramis acute tetragonis, longis et tenuibus, striatis, infra minute pubescentibus. Folia petiolata petiolis (foliorum principalium) 2.5–4 cm. longis et ad basim ciliatis connatisque, petiolo adjecto 10–12 cm. longa, pinnata, serrata vel dentata (vel etiam inciso-dentata), ciliata, foliolis ovatis vel ovato-lanceolatis, saepe duobus vel quattuor imis cuiusque folii tripartitis. Capitula multa, subradiata, tenuiter pedunculata pedunculis 3–8 cm. longis, ad anthesin 4–7 mm. alta et 0.8–1.3 cm. lata, cum achaeniis 1.2–1.4 cm. alta et 6–8 mm. lata. Involucrum basi hispidum; bracteis exterioribus (circ. 8) linearibus, fere glabris, apice induratis, 2–3 mm. longis; interioribus dimidio longioribus, anguste lanceolatis. Flores ligulati (3–6) subalbidi, ligula anguste ovati, 4–7-striati, 4–6 mm. longi. Achaenia linearia, atra, glabra vel supra sparsim hispida, corpore 6–12 mm. longa, apice 2–4-aristata aristis flavis et retrorsum hamosis, 1.5–2.5 mm. longis.

Type specimen: Collected by *Edward Palmer*, No. 756, on west side of Iron Mountain, vicinity of Durango, State of Durango, Mexico, October, 1896 (Gray).

Distribution: States of Sonora and Chihuahua to State of Mexico, Mexico.

Specimens examined: *Berlandier* 875, around City of Mexico, Federal District, September 19, 1827 (Del.; Par.; type collection of *Bidens Anthriscoides* var. *angustiloba* DC.); *Edward Palmer* 612, vicinity of Durango, State of Durango, Mexico, October, 1896 (Berl.; Boiss.; Brit.; Calif.; Field, 2 sheets; Gray; Kew; Mo.); *idem* 756 (type, Gray: cotypes, Berl.; Boiss.; Brit.; Calif.; Field; Kew; Mo.; U.S.); *I. L. Wiggins* 7396, La Mina Verde, 31 km. from Cumpas, Sonora, Mexico, September 23, 1934 (Field).

At the time that this species was described, I looked upon *B. pilosa* L., *B. leucantha* (L.) Willd., *B. bimucronata* Turcz., *B. odorata* Cav., and several other similar forms as representing distinct species. *B. duranginensis*, therefore, was considered to be a distinct form and clearly entitled to specific rank. Since then, examination of a vast

amount of additional material from European herbaria has compelled the conclusion that these forms, while doubtless seeming distinct in certain localities, at various places in their distributional range intergrade so thoroughly that all hope of their specific segregation must be abandoned.

This being true, the question at once arises whether *B. duranginensis*, clearly a close relative of *B. pilosa*, is merely another of *B. pilosa's* many varietal manifestations, or whether, like *B. subalternans* DC., *B. biternata* (Lour.) Merr. & Sherff, and several other *pilosoid* forms, it is a valid species. Certainly it is very close in flowers and fruits to some undisputed forms of *B. pilosa* var. *radiata* Schz. Bip. *C. V. Hartman* 113 (alt. 1,740 meters, Las Calabazas, State of Sonora, Mexico, October 9, 1890; Gray; Kew; Penn.; Phila.) is a form which in some specimens appears closer to the young state of *B. duranginensis* (as typified by *Palmer* 612) and yet in others appears referable to *B. pilosa* var. *radiata*. Aside from questionable approaches of this kind, I have been unable to obtain any legitimate basis for referring *B. duranginensis* to synonymy and so feel compelled to retain it as a separate species.

EXPLANATION OF PLATE XCVI, FIGS. *j–q*

Bidens duranginensis: j, flowering and fruiting branch, ×0.57; *k*, exterior involucral bract, ×4.56; *l*, interior involucral bract, ×4.56; *m*, ray corolla, ×4.56; *n*, palea, ×4.56; *o*, disc floret, ×4.56; *p* (outer), *q* (inner), achenes, ×4.56; all from type.

130. **Bidens pseudocosmos** Sherff, Bot. Gaz. 76: 151. 1923. Pl. CI, figs. *h–n*.

Herba annua, erecta, glabra, ramosa, saltem 4 dm. et verisimiliter usque ad 10 dm. alta, caule ramisque tetragonis. Folia tenuiter petiolata petiolis 0.5–3 cm. longis, petiolo adjecto 2–8 cm. longa, bipinnata, saepe ad petiolorum basim et rarius alibi hinc illinc paucis pilis vestita, foliolis primariis 3–7, ultimis segmentis linearibus acriter calloso-apiculatis. Capitula ramos terminantia pedunculis 3–9 cm. longis, discoidea vel obscure subradiata radiis 4–5 minutis albido-luteis, ad anthesin minima, 4–5 mm. alta et circ. 6 mm. lata; demum 2.5–3 cm. alta et 1–2 cm. lata. Involucrum basi hispidum; bracteis exterioribus 6–8, anguste linearibus, ciliatis, apice acute apiculatis, 4–6 (rarius–8) mm. longis, quam interioribus lanceolatis manifeste brevioribus. Paleae maturae 1–1.3 cm. longae, quam achaenia matura multo breviores. Achaenia atra, tenuissime linearia, tetragona, exalata, supra tenuiter sed sensim elongata et

BIDENS RIPARIA H.B.K. (figs. *i–p*); var. REFRACTA (Brandeg.) O. E. Schulz (figs. *a–h*)

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antrorsum setis stramineis hispida, infra glabra, corpore 1–2.4 cm. longa et 0.4–0.7 mm. lata, biaristata aristis tenuibus erectis divaricatisve stramineis retrorsum hamosis 2–3.5 mm. longis.

Type specimen: Collected by *Otto Buchtien*, No. 815, at altitude of 3,300 meters, below Obraje, southeast of La Paz, Bolivia, May 10, 1919 (Field, 2 sheets).

Distribution: Central western Peru to central western Bolivia.

Specimens examined: *Buchtien* 815 (Field, 2 type sheets: cotypes, Field; Gray; Hamb.; U.S.); *J. F. Macbride* 2904, alt. about 2,400 meters, sunny slide rock, Matucana, Peru, March 14–16, 1923 (Field); *idem & Featherstone* 168, alt. about 2,400 meters, gravelly river bank, eodem loco, April 12–May 3, 1922 (Field).

A species with somewhat the aspect of *Cosmos*. The flowering heads are those of *Bidens*, however, and the achenes are not abruptly narrowed above into a neck or beak as in typical *Cosmos*. The general habit bears a superficial resemblance to that of certain branched forms of the North American *Bidens tenuisecta* Gray. Apparently the closest ally is *B. andicola* var. *Cosmantha* f. *Buchtienii*. In fact, the fruiting characters of f. *Buchtienii* are so similar that at first the remarkable habit and foliage differences in *B. pseudocosmos* were thought attributable to the fact that the specimen came from a larger plant than the observed specimens of f. *Buchtienii*. Additional sheets of *B. pseudocosmos* were found later, however, bearing small, entire, fruiting plants and even here both the habit and the foliage distinctions were found to hold true.

EXPLANATION OF PLATE CI, FIGS. *h–n*

Bidens pseudocosmos: h, fruiting branch, ×0.62; *i*, exterior involucral bract, ×2.48; *j*, interior involucral bract, ×2.48; *k*, palea, ×2.48; *l*, disc floret, ×4.96; *m* (outer), *n* (inner), achenes, ×2.48; all from type.

131. **Bidens pseudalausensis** Sherff, Bot. Gaz. 64: 26. 1917. Pl. XCII, figs. *a–g*.

Herba verisimiliter annua, circ. 6 dm. alta (e Langlassei inscriptione), ramosa; caule et ramis tetragonis et acute angulatis, striatis, glabris. Folia petiolata petiolis 0.2–2 cm. longis, petiolo adjecto 2–7 cm. longa et 1–5.5 cm. lata, bi-tripinnatisecta, glabra; ultimis lobis cuneato-oblanceolatis, dentatis dentibus ad apicem induratis. Capitula terminalia, tenuiter pedunculata pedunculis 1.5–6 cm. longis, radiata, pansa ad anthesin 6–7 mm. alta et circ. 1.5 cm. lata. Involucrum basi glabrum, bracteis exterioribus (circ. 8) linearibus,

ciliatis, 2–3 mm. longis; interioribus paulo longioribus, glabratis, margine diaphanis. Flores ligulati (circ. 5) albi (e Langlasseo), in specimine sicco luteoli, striati, ligula obovati, ad apicem lobulati vel obtusissime dentati, 5–7 mm. longi. Achaenia linearia, nigra, faciebus plus minusve glabra, marginibus tuberculato-hispida, biaristata (aristis sub apice retrorsum hamosis), corpore 7–9 mm. longa.—Differt a *B. pilosa* var. *alausensi* habitu ramorum, etc.

Type specimen: Collected by *E. Langlassé*, No. 541, at altitude of 580 meters, Cerro Pedregoso, El Ocote, State of Michoacán, Mexico (U.S.).

Distribution: Known only from type locality in State of Michoacán, Mexico.

Specimens examined: *Langlassé* 541 (type, U.S.: cotypes, Gray; Kew).

A species of uncertain status.

EXPLANATION OF PLATE XCII, FIGS. *a–g*

Bidens pseudalausensis: a, flowering and fruiting branch, ×0.57; *b,* exterior involucral bract, ×3.44; *c,* interior involucral bract, ×3.44; *d,* ray corolla, ×3.44; *e,* palea, ×3.44; *f,* disc floret, ×3.44; *g,* achene, ×3.44; all from type.

132. **Bidens pilosa** L. Sp. Pl. 832. 1753. Pl. XCIX, fig. *b*, and pl. CII, figs. *a*, *b*, and *e–j*.

Ceratocephalus pilosus (L.) Rich. Cat. Jard. Médic. 91.[1]

Bidens reflexa Link, Enum. Hort. Berol. 2: 306. 1822.

Bidens adhaerescens Vell. Fl. Flum. 348, 8. *pl. 88.* 1827 (pro parte).[2]

Bidens californica DC. Prodr. 5: 599. 1836.

Bidens decussata Pav. ex DC. loc. cit.

Bidens pilosa var. *b. discoidea* Schz. Bip. in Barker-Webb & Berthelot, Hist. Canar. Isls. III, 2, pt. 2: 242. 1836–1850.

Bidens ciliata Hoffmgg. ex Fisch. & Mey. Ind. Sem. Hort. Petrop. 6: 46. 1839.

Bidens hirsuta Nutt. Trans. Amer. Phil. Soc. II, 7: 369. 1841.

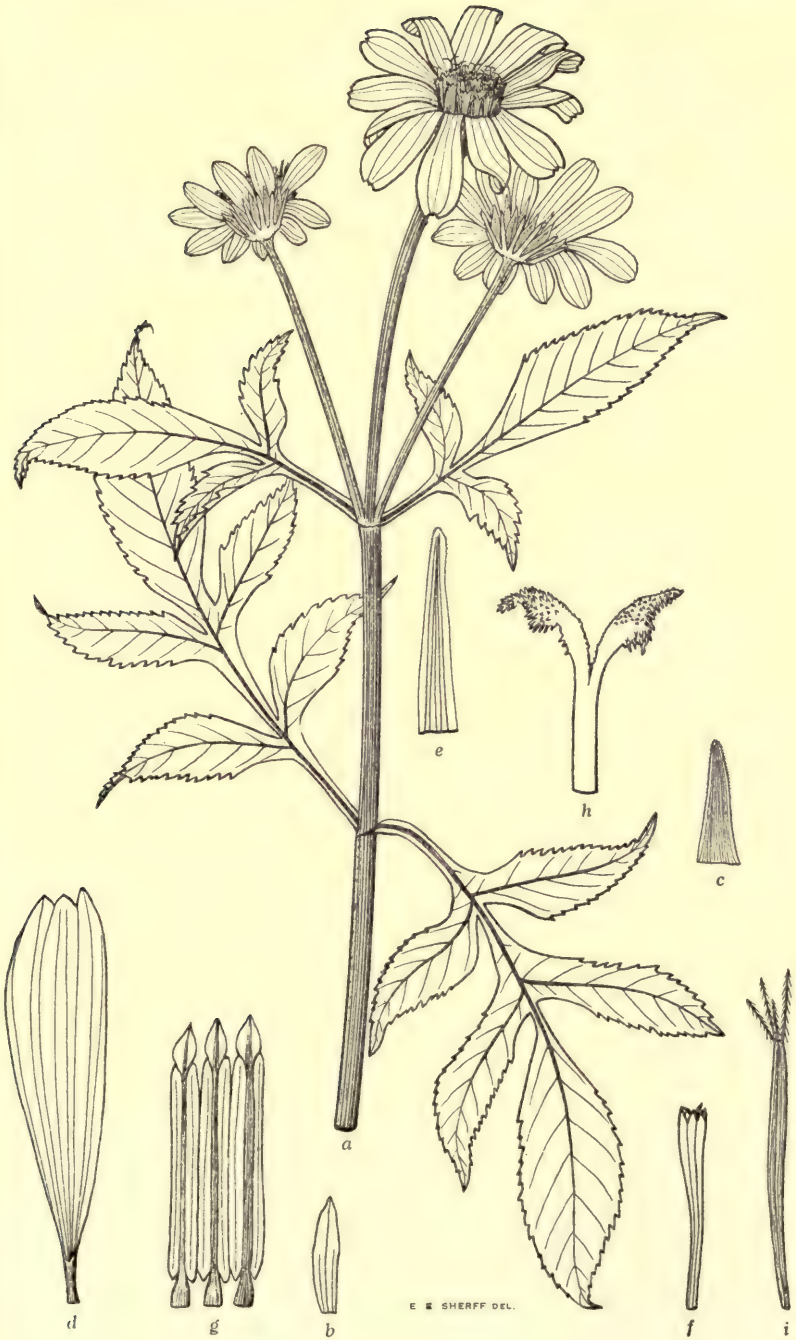
Bidens leucantha f. *discoidea* Schz. Bip. in Krauss, Beitr. Fl. Cap. Natal. 77. 1846.

Bidens leucantha f. *discoidea* subf. *Kraussii* Schz. Bip. loc. cit.

Bidens leucantha var. *pilosa* (L.) Griseb. Cat. 155. 1866.

[1] Ricardi liber non visus sed nomen ex O. E. Schulzio (in Urban, Symb. Antill. 7: 134. 1911) acceptum.

[2] Spelled *B. adherescens* on Vellozo's plate.



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Kerneria pilosa (L.) Lowe Man. Fl. Madeira 1: 474. 1868.

Kerneria pilosa var. β. *discoidea* (Schz. Bip.) Lowe, loc. cit.

Bidens pilosa var. I *pilosa* proper (L.) J. D. Hook. Fl. Brit. Ind. 3: 309. 1881.

Bidens montaubanii Phil. Anal. Mus. Nac. Chile Bot. 1891: 49. 1891 (*B. montsulani* sphalm in Ind. Kew. Suppl. 1: 56. 1901–1906).

Bidens pilosa var. β. *discodea*, [f.] 1. *subsimplicifolia*, [f.] 2. *ternata*, [f.] 3. *pinnata*, and [f.] 4. *subbiternata* O. Kuntze, Rev. Gen. 1: 322. 1891.[1]

Bidens pilosa subvar. β. *discoidea* (Schz. Bip.) Pitard in Pitard & Proust, Iles Canar. Fl. Archipel. 226. 1908.

Bidens pilosa f. *subsimplicifolia* O. Ktze. and f. *subbiternata* O. Ktze. ex O. E. Schulz in Urban, Symb. Antill. 7: 133. 1911.

Bidens pilosa var. *discodea* f. *ternata* O. Ktze. and f. *pinnata* O. Ktze. ex O. E. Schulz, op. cit. 134.[2]

a. Capitula normaliter discoidea . . . . . *B. pilosa* sensu stricto.

a. Capitula radiata radiis magnis parvisve.

b. Flores ligulati pro capitulo minuti, flavidi vel albidi, circ. 4–8 mm. longi.

c. Foliola normaliter serrata membranaceaque, floribus ligulatis circ. 5–8 mm. longis . . . . . var. β. *minor* sensu stricto.

c. Folia paucidentata ac valde membranacea, floribus ligulatis circ. 4 mm. longis . . . . . var. β. *minor* f. 1. *umbrosa*.

b. Flores ligulati pro capitulo majores, flavidi vel albidi vel plus minusve rosacei.

c. Capitula pansa ad anthesin 1–1.5 cm. lata.

d. Plantae principaliter mexicanae sed usque ad Colombiam rarius extendentes.

e. Folia pinnatim vel subbipinnatim partita foliolis ovatis lanceolatisve . . . . . var. η. *calcicola* sensu stricto.

e. Folia bipinnata vel etiam tripinnatisecta segmentis linearibus vel anguste lanceolatis.

var. η. *calcicola* f. 1. *dissecta*.

d. Plantae austro-americanae septentrionaliter ad Ecuadoriam vel rarius etiam usque ad Colombiam extendentes.

[1] Cf. footnote under var. *radiata*. Kuntze (loc. cit.) does not make the status of "1. *subsimplicifolia*," etc., clear, but reference to a later volume (3, pt. 2: 137. 1898) shows that these were formae, as indeed they were later set forth by O. E. Schulz (vide supra).

[2] *Bidens pilosa* var. *puberula* Schz. Bip. (Flora 39: 356. 1856) was merely a nomen applied to *Edelstan Jardin* 42, Nukahiva, Marquesas Isls. I could not find authentic material of this number among Jardin's Nukahiva plants (Par.).

e. Folia pinnato-quinquepartita vel biternatisecta vel tantum pinnatisecta, foliolis segmentisve saepius plus minusve ovatis.....var. ε. *alausensis.*

e. Folia plus dissecta, saepe tripinnatisecta, segmentis angustioribus.....var. ε. *alausensis* f. 1. *scandicina.*

c. Capitula pansa ad anthesin plerumque 1.5–3 cm. lata.[1]

d. Folia pinnata, foliolis ovatis vel lanceolatis.

e. Tota planta plerumque viridis, ligulis saepius flavidis vel albidis.....var. γ. *radiata.*

e. Tota planta plerumque pallido-caerulea, ligulis saepius rosaceis.....var. δ. *bimucronata.*

d. Folia plus dissecta, plerumque bi- vel rarius tripinnata, segmentis angustioribus..var. δ. *bimucronata* f. 1. *odorata.*

Herba annua, erecta, ramosa, 0.3–1.8 m. alta; caule tetragono, glabrato vel saepe sparsissime piloso, stramineo-viridi vel purpurascenti. Folia petiolata petiolis 1–6.5 cm. longis, membranacea, marginibus serrata ciliataque, utrinque glabrata vel pilis inaequalibus adpressis disperse pilosa vel interdum dense tomentoso-pilosa; ima saepe simplicia, ovata, apice acuta, lamina 1.5–7 cm. longa; media plerumque 3–5 (vel etiam –7) -partita, petiolo adjecto 0.5–2 dm. longa, foliolo terminali oblongo-ovato vel lanceolato acuminato ad basim decurrenti, lateralibus proximis minoribus ovatis vel lanceolatis acutis sessilibus vel decurrentibus, infimis majoribus et breviter petiolulatis et rarissime plus minusve ternatisecta; summa simplicia, lanceolata. Capitula discoidea vel interdum obsolete radiata, ad anthesin 7–8 mm. lata et 5–7 mm. alta, 25–40-flora, tenuiter pedunculata pedunculis 1–9 cm. longis. Involucri basis hispida; bracteis exterioribus 7–9, linearibus vel linearispathulatis, indurato-apiculatis, ciliatis, 4–5 mm. longis, quam interioribus lanceolatis brevioribus. Flores ligulati plerumque deficientes (rarissime minuti, 2–3 mm. longi, albidi vel flavido-albi). Achaenia linearia, recta vel marginalia subincurvata, obcompresso-tetragona vel subcomplanata, infra glabra, supra tuberculato-strigosa, 2- vel 3- (rarius 4- vel rarissime 5-) aristata aristis flavidis retrorsum hamosis 2–4 mm. longis, corpore 4–16 mm. longa, interiora superne elongata et marginalibus multo longiora.

Type specimen: No particular specimen was mentioned. The first pre-Linnean synonym given by Linnaeus was the Bidens corona seminum retrorsum aculeata, seminibus undique patentibus

[1] Var. ζ. *Apiifolia* intermedia est et var. *alausensi* ac var. *radiatae* affinis est.

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of the Hortus Cliffortianus (p. 399. 1737). The first and only Hortus Cliffortianus synonym given was the Bidens latifolia hirsutior, semine angustiore radiato of Dillenius (Hort. Eltham. 51. *pl. 43. f. 51* and *1, 2, 3, 4.* 1732). Dillenius' illustration was of a specimen still extant in the Dillenian Herbarium (Oxf.; vide p. 397, footnote 3), which is a slightly abnormal plant (as to leaves) of the at present widely known and accepted *Bidens pilosa* L. An excellent and more typical specimen is the one labeled *Bidens pilosa* in the official Linnean set at London (Linn.).

Distribution: Widely distributed in tropical and subtropical regions. In the Western Hemisphere from California southeastward through Mexico, Central America, and South America to Chile, Argentina, and Uruguay, also in the West Indies; throughout Africa; in southeastern Asia, East Indies, Australia, New Zealand, and many other islands of the Atlantic, Pacific, and Indian oceans.

Specimens examined:[1] *LeRoy Abrams* 2484, along streets, Inglewood, California, May 31, 1902 (Del.; Field; Kew; Phila.); *anon.* (Linn., 2 sheets, sub nominibus *Bidente pilosa* et *B. pilosa* var.); *anon.* 123, Manoa Valley, Oahu, Hawaiian Isls., May 13, 1854 (Petrop.); *C. F. Baker* 2204, Masaya, Dept. Masaya, Nicaragua, January 27, 1903 (Del.; Gray; Kew; Mo.); *idem* 3729, Claremont, California, October 1, 1903 (Del.; Gray; Kew; Mus. V.); *J. H. Barber* 158, Santa Monica Experiment Station, California, May 24, 1897 (Calif.); *R. Baron* 43, chiefly in Betsileo-land, Madagascar (Kew); *Gust. Bernoulli* 477, Chojojá near Mazatenango, Guatemala, September, 1867 (Del.; N.Y.); *Beyrich,* sandy places around Rio de Janeiro, State of Rio de Janeiro, Brazil, January, 1845 (Boiss.); *J. Bornmüller* 743, in rubbish heaps, Funchal, Madeira, March 19, 1900 (Berl.; Mus. V.; U.V.); *E. Bourgeau* 150, San Angel, Federal Distr., Mexico, May 23, 1865–1866 (Kew); *idem* 847 pro parte, near Santa Cruz, Palma, Canary Isls., August 14, 1845 (Kew); *L. J. K. Brace* 4121, Albert Town, Long Cay, Bahamas, December 7–17, 1905 (Field); *Ernest Braunton* 674, Los Angeles, California, September, 1902 (Calif.); *W. H. Brewer* 285, Santa Barbara, California, March, 1861 (U.S.); *N. L. Britton* 2631, roadside, Grierfield near Moneague, Jamaica, April 3, 1908 (Field); *W. E. Broadway* 5128, St. Ann's

[1] In the fruiting stage, specimens of the minutely radiate var. *minor* frequently look like those of the species proper and it is more than likely that several collections have been included here for *B. pilosa* whereas younger material (i.e., in its minutely radiate state) would have led to determination as var. *minor.* In a number of cases, I had determined specimens in certain herbaria as *B. pilosa* and later found the duplicates in other herbaria to be characteristic of the var. *minor.* In all such cases, as far as known, the collections are cited under that variety.

Cascade, Trinidad, November 27, 1923 (Del., 2 sheets); *W. A. Bryan*, Salt Lake, Oahu, Hawaiian Isls., December 13, 1903 (Bish.); *Otto Buchtien*, alt. 2,450 meters, Cotaña on the Ilimani River, Bolivia, November, 1911 (Field); *idem*, alt. 1,100 meters, Polo-Polo near Coroico, North Yungas, Bolivia, October–November, 1912 (Field); *idem* 287, alt. 2,100 meters, South Yungas, Bolivia, November 16, 1906 (Field); *idem* 1574, on roads, alt. 750 meters, San Carlos near Mapiri, Bolivia, September, 1907 (Field); *idem* 4409, Arica, Chile, September, 1914 (Field); *idem* 5628 and 5628*bis*, alt. 1,400 meters, Hacienda Simaco on road to Tipuani, Bolivia, January, 1920 (Field; forma nonnullis centralibus achaeniis elongatis atque eis *Cosmidis* non dissimilibus); *F. S. Collins* 8, roadside near Flatts, Bermuda, April 24, 1912 (Gray); *idem* 303, Middle Road, Bermuda, August 24, 1913 (Berl.; Kew); *Conzatti & González* 1000, alt. 1,750 meters, State of Oaxaca, Mexico, July–August, 1900 (Berl.; Gray); *C. C. Deam* 241, alt. 126 meters, along river, Gualán, Guatemala, January 20, 1905 (Gray; Mo.); *F. Didrichsen* (*Galathea Expedition*) 3515 and 3520, Pulo Penang, Penang, Malay Peninsula, 1845–1847 (Cop.); *idem* 3547, Oahu, Hawaiian Isls., eodem tempore (Cop., 2 sheets); *idem* 3625, Tahiti, Society Isls., eodem tempore (Cop.); *Mrs. A. Dieterlen* 2719, alt. 1,500–1,800 meters, Leribe, Basutoland (Kew); *Amalia Dietrich*, near Brisbane River, eastern Australia, 1863–1865 (Mus. V.); *David Douglas*, California, 1833 (Brit.); *idem* 56, California, 1833 (Del.; Gray; Kew, 2 sheets; type material of *Bidens californica* DC.); *A. D. E. Elmer* 3798, Santa Barbara, California, May, 1902 (Berl.; Del.; Field; Kew; Mus. V.); *A. Engler* 2506, high plain, Transvaal, August 20, 1905 (Berl.); *Urbain Faurie* 967, Oahu, Hawaiian Isls., April, 1909 (Del.); *A. Fendler* 695 pro parte, Venezuela, 1854–1855 (Mo.); *C. N. Forbes* 200*H*, summit of Hualalai, Hawaii, Hawaiian Isls., June 18–21, 1911 (Bish.); *idem* 1062*O*, Nuuanu Valley, Oahu, Hawaiian Isls., January 24, 1909 (Bish.); *George Gardner* 501, Organ Mts. (Serra dos Orgaõs), State of Rio de Janeiro, Brazil (Berl.; Del.; Kew; Mus. V.); *Garnier* 51, Madagascar, spring of 1869 (Par.); *Claude Gay*, Prov. Coquimbo, Chile, 1839 (Del.); *A. Glaziou* 8755, Brazil (Berl.); *Goudot*, vicinity of Tananarivo, Madagascar (Del.); *Ludwig Hahn* 385, Martinique, December, 1867 (Berl.; Boiss.; Del., 2 sheets; Mus. V.); *O. Hansen*, in mountains, Jamaica, January, 1897 (Cop.); *A. A. Heller* 2090, slopes of Makiki, Oahu, Hawaiian Isls., April 5, 1895 (Boiss.; Field; Mo.); *idem* (similiter) 2090, along Hanapepe River, near the Falls, Kauai, Hawaiian Isls., July 2–8, 1895 (Field); *idem* (similiter) 2090, on Kaholuamanu, above

Waimea, Kauai, Hawaiian Isls., September 2–9, 1895 (Bish.); *Aug. Henry* 108, in mountains, Formosa (Berl.); *Heyde & Lux* 4208 p.p., alt. 900 meters, Los Verdes, Dept. Amatitlán, Guatemala, November, 1892 (Berl., 2 sheets; Gray); *William Hillebrand*, Madeira, October, 1876 (U.V.); *idem & J. M. Lydgate*, Hawaiian Isls. (Bish.); *C. Hoffmann* 804, Costa Rica, 1857 (Berl.); (for *R. F. Hohenacker* 276, once referred here, see *B. biternata*); *Fr. Holl*, along stream near Funchal, Madeira, September 12, 1827 (Mus. V.); *E. W. D. Holway* 27, San Rafael, Dept. Guatemala, Guatemala, January 7, 1915 (Gray); *J. D. Hooker*, New Zealand (Kew); *Hort. Bot. Berol.* e seminibus e Mexicine missis (Berl.; type of *Bidens reflexa* Link); *Hort. Elthamensis*, sub No. 43.51.51 (Oxf.); *T. Husnot*, rocky places, Santa Cruz, Teneriffe, Canary Isls., March, 1866 (U.V., 2 sheets); *Jenman* 4984, Demerara River, British Guiana, March, 1889 (N.Y.); *W. A. Kellerman* 5321, Palmar, Dept. Quezaltenango, Guatemala, February 11, 1906 (Field); *idem* 6436, alt. 237 meters, Retalhuleu, Dept. Retalhuleu, Guatemala, January 10, 1907 (Field); *Ferd. Krauss*, southern Africa, March, 1839 (Mun.); *idem*, eodem loco, 1842 (Flor.); *F. M. Liebmann* 634, Mirador, Vera Cruz, Mexico, March, 1842 (Cop.); *idem* 635, Yavesta, Oaxaca, Mexico, September, 1842 (Cop., 2 sheets; forma foliis minoribus ac magis membranaceis, foliolis jugi inferioris tripartitis, achaeniis eis *Bidentis bipinnatae* aegre similibus; a Schultzio Bip. in herb. rite pro *B. pilosa* determinata); *idem* 653, Mirador, Vera Cruz, Mexico, January, 1842 (Cop.); *E. Langlassé* 971, alt. 1,000 meters, clay soil, El Porvenir, southern Mexico, March 27, 1899 (Berl.; U.S.); *F. E. Lloyd* 177, Laudat, Dominica, West Indies, 1903 (Kew); *J. F. Macbride* 2683, Darién, Panama, February 23, 1923 (Field); *idem* 3174, Ambo, Peru (Field); *idem* 3180, alt. 2,100 meters, eodem loco, April 5, 1923 (Field); *Mann & Brigham* 49, Oahu, Hawaiian Isls. (Bish.; Corn.; Gray); *W. R. Maxon* 724, Annatto Bay, Jamaica, April 7, 1903 (U.S.); *Katherine Mayo*, Paramaribo, Surinam, May 10, 1905 (Phila.); *E. A. Mearns*, Baguio, Prov. Benguet, Luzon, Philippine Isls., April, 1907 (Man.); *C. F. Millspaugh* 1275, Spot Bay, Grand Cayman Isl., West Indies, February 13–14, 1899 (Field); *idem* 2610, Oahua, Hawaiian Isls., September 12, 1911 (Field); *Otto Moller*, introduced, Isl. Amager, Denmark, October 20, 1895 (Cop.); *Fred Müller* 544 p.p., Orizaba, Mexico, 1855 (N.Y.); *G. C. Munro* 146, Palawai, Lanai, Hawaiian Isls., October 10, 1913 (Bish.); *Thomas Nuttall*, Oahu, Hawaiian Isls. (Brit., sub nom. *B. pubescenti*); *idem*, Hawaiian Isls. (Brit., sub nom. *B. hirsuta*); *Richard Oldham* 259,

Tamsuy, Formosa, 1864 (Boiss.; Mus. V.); *C. R. Orcutt* 120, Santo Tomás, Lower California, Mexico, September 24, 1884 (Field); *idem* 3026, Sanborn, Vera Cruz, Mexico, April 18, 1910 (Field); *idem* 5429, Río Verde, San Luis Potosí, Mexico, November 17, 1910 (Mo.; forma achaeniis longioribus ac dense spinuloso-hispidis, eis nonnullarum var. *bimucronatae* formarum non valde dissimilibus); *Corn. Osten* 5978, Dept. Montevideo, Uruguay, March 3, 1912 (Field); *Edward Palmer* 440, Parras and vicinity, Coahuila, Mexico, October 6–11, 1898 (Calif.; Del., 4 sheets; Field; Mo.); *idem* (similiter) 440, vicinity of Mapimi, Durango, Mexico, October 21–23, 1898 (Kew); *S. B. Parish* 6486, alt. about 300 meters, damp land, meadows, swamps, San Bernardino Valley, California, September 21, 1907 (Field; forma nonnullis inferioribus foliolis, his tripartitis); *idem & W. F. Parish* 184, San Bernardino, California, July, 1881 (Berl.; Boiss.; U.V.); *M. E. Peck* 277, clearing near Manatee Lagoon, British Honduras, January 8, 1906 (Gray); *Gustave Perdonnet* 345, State of São Paulo, Brazil, 1840–1846 (Boiss.); *Philippi*, Prov. Tarapacá, Chile, communic. 1888 (type material of *Bidens Montaubanii* Phil.); *H. Pittier* 4362, Mt. Carpintera, Costa Rica, August 2, 1891 (Gray); *idem* 9140, Guaremales near Urama, Carobobo, Venezuela, December 10, 1920 (Berl.); *idem & Ad. Tonduz* 8724, alt. 100 meters, forests of Tsuritkub, Costa Rica, April, 1894 (Boiss.; forma umbrosa, foliis valde membranaceis); *Poeppig* 1569, very common along roads near Pampayacu, Dept. Huánuco, Peru, December, 1829 (Mus. V.); *C. A. Purpus*, San Luis Tultitlanapa, Puebla, Mexico, August, 1908 (Calif.);[1] *Karl & Lily Rechinger* 2043, slopes of the Volcano Kilauea, Hawaii, Hawaiian Isls., April, 1905 (Mus. V.); *iidem* 2139, ditches at Honolulu, Hawaii, Hawaiian Isls., April, 1905 (Mus. V.); *A. F. Regnell* III. 777, Caldas, Minas Geraes, Brazil, April 28, 1874 (Berl.); *Reinecke* 22, Samoa, 1893 (Boiss.); *A. E. Ricksecker* 473, spring garden, St. Croix, West Indies, July 13, 1896 (Mo.); *J. Robertson* 106, Stann Creek, British Honduras, February 20, 1890 (Brit.); *F. A. Rogers* 23904, crocodile farm, Barberton, Transvaal, December, 1920 (Kew); *E. Rothschuh*, alt. 1,000 meters, rain forest, Cañada Yasica, Dept. Matagalpa, Nicaragua, February 20, 1894 (Berl.); *idem* 244, on roads, eodem loco, August 19, 1893 (Berl.); *H. H. Rusby* 1619, alt. 1,800 meters, Yungas, Bolivia, 1885 (N.Y.); *idem & R. W. Squires* 232, Catalina, lower Orinoco River, Venezuela, May, 1896 (Berl.; Boiss.; Del.; Kew; Mo.; Mun.; Phila.; U.V., 2 sheets); *Sallé*, Orizaba, Mexico,

[1] Two plants by Raunkiaer (Cop.), determined by me at first as *B. pilosa*, may have to be referred to *B. domingensis* (q. v.) if that species is to be retained.

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1854–1855 (Del., 3 sheets); *J. G. Schaffner* 383, Tequisquiapan, Querétaro, Mexico, October, 1880 (Gray; Kew; Mo.); *Scherzer*, alt. 1,230 meters, San José, Costa Rica (Mus. V.); *L. Schlim* 113, alt. 1,050 meters, Ocaña, Prov. Ocaña, Colombia, September, 1850 (Del., 2 sheets); *Schomburgk* 455 p.p., British Guiana (Mus. V.); *Berthold Seemann* 270 p.p., Fiji Isls., 1860 (Del.; Mus. V.; nom. incolarum, Batimadramadra); *idem* 2047, Sierra Madre, northwestern Mexico (Kew); *Eduard & Caecilie Seler* 2534, San Andrés Osuna, Dept. Escuintla, Guatemala, May 7, 1896 (Berl.); *Sieber* 330, Martinique (Berl., 2 sheets; Mo.); *P. Sintenis* 391, in maritime and montane forests, Maricao, Puerto Rico, November 17, 1884 (Berl., 2 sheets; Boiss.; Del.; Mo.); *idem* 4653, among bushes, Adjuntas, Puerto Rico, June 24, 1886 (Del.; Mo.; U.V.); *H. H. Smith* 598, alt. 1,350 meters, Santa Marta, Colombia, December, 1898–1901 (Berl.; Del.; Kew; Mo.); *idem* 599, alt. 750 meters, eodem loco et tempore (Berl.; Carn.; Del.; Field; Man.; Mo.; Phila.); *J. D. Smith* 2350, alt. 1,500 meters, Guatemala, Dept. Guatemala, Guatemala, February, 1890 (Field); *P. C. Standley* 23977, alt. 75–225 meters, open slope, Quiriguá, Dept. Izabal, Guatemala, May 15–31, 1922 (Mo.); *J. F. G. Stokes*, Kaali, Niihau, Hawaiian Isls., January, 1912 (Bish.); *D. L. Topping* 2833, garden, Honolulu, Oahu, Hawaiian Isls., September 6, 1924 (N.Y.); *C. H. T. Townsend A*102, alt. 2,000 meters, near San Pedro, Ecuador, November 25, 1910 (U.S.); *idem A*200, alt. 1,350 meters, Hacienda Charape on the Río Tabaconas, Prov. Jaén, Peru, September 18, 1911 (Field); *H. H. Travers*, introduced, swampy coast places, Wellington, North Isl., New Zealand, October, 1908 (Man.; forma foliis valde membranaceis et foliolis inferioribus subdivisis, aristis 2); *J. Triana* 1373, Colombia (Berl.; N.Y.); *Knei Chen Ts'ao* (*Herb. Univ. Nanking* No. 1549), Bau Hiva Shan, Kiangsu Prov., China, October 14, 1915 (Calif.; a second-growth form simulating *B. Engleri*, *B. tenera*, *B. leptocephala*, etc., in characters of the fruiting heads); *Eugene Warming* 38, Barbados, West Indies, November 13, 1891 (Cop.); *idem* 638, Lagoa Santa, Minas Geraes, Brazil, March 17, 1864 (Cop.); *idem* 639 pro parte, eodem loco (Cop.); *idem* 640, Morro de San Antonio, State of Rio de Janeiro, Brazil, May 7, 1863 (Cop.); *idem* 643 pro parte, Lagoa Santa, Minas Geraes, Brazil (Cop.); *Wawra* (*H. M. Maximilian's Journey to Mexico*) 1035, Mirador and vicinity, Vera Cruz, Mexico (Mus. V.); *idem* (*Circumnav. H. M. Frigate "Donau"*) 1811, Maui, Hawaiian Isls., 1868–1871 (Mus. V., 2 sheets); *S. J. Whitmee*, Samoa (Gray); *Widgren* 253, Caldas, Minas Geraes, Brazil, December 15, 1845 (Berl.; Cop.); *C. S.*

Williamson, Los Angeles, California, July 24, 1901 (Phila.); *F. Wilms* 845 p.p., Distr. Lydenburg, Transvaal, December, 1887 (Del.; Kew; U.V.); *Hubert Winkler* 101, Victoria, Kamerun (Berl.); *Charles Wright* 316, eastern Cuba, 1856–1857 (Boiss.; Del.; Gray; Kew; Mo.; Phila.); *idem* 317 pro parte, eodem loco et tempore (Gray; Kew); *idem* (similiter) 317, eastern Cuba, 1860 (Mus. V.); *H. Wydler* 228, in cultivated places, Puerto Rico, May–June, 1827 (Del., 2 sheets; foliorum superiorum foliolis inferioribus tripartitis, forma *Bidenti subalternanti* aegre simili); *Yates* 632, Santa Barbara, California, October 3, 1894 (Boiss.); *H. Zollinger* II. 410, Java (Del.).[1]

The pre-Linnean setting of *B. pilosa* has already been given (vide sub "Type specimen"). Much pertinent material will be found under the following varieties and formae. We may note the status of certain post-Linnean synonyms which either are not self-explanatory or else do not receive adequate treatment in the list of "Specimens examined."

The name *Bidens reflexa* Link has been variously construed by botanists during the past century. This is doubtless due to the fact that more than one species was obtained in European botanical gardens from supposedly *B. reflexa* achenes which had been sent out from Berlin. Thus, some of the *B. reflexa* material in the Berlin Herbarium is *B. pilosa* L., while in the Herbarium of the University of Halle, for example, a specimen labeled "*Bidens reflexa* Hort. bot. Berol." is really *B. serrulata* (Poir.) Desf. Fortunately there exists in the Berlin Herbarium an original specimen by Link. Its main label says, in pencil, "*Bidens sp.* Mexico." In ink is written "reflexa m. (Link)." Another label says, "*Bidens reflexa* Link En. 2. p. 306. Hort. Bot. Berol." This specimen is clearly of Link's type material and matches his description, except that he erred in calling it a perennial, for it is an annual. It is nothing more than *B. pilosa* L., to which it must be referred.

A careful study of Vellozo's description and illustration of his *B. adhaerescens* shows that plant to be none other than *B. pilosa* L. His description of the capitulum is not above criticism. In the short, abridged description at the beginning we read: "floribus terminalibus, discoideis," which would limit the description to *B. pilosa* proper. In the detailed description which follows, however, we read: "Co-

[1] In South America *B. pilosa*, in common with such related species as *B. Gardneri* and *B. riparia*, is often called Picão (fide F. Hoehnei et al.).

Concerning the value of *B. pilosa* as a forage plant, especially for horses with intestinal parasites, and as a plant to be considered in connection with bananas for cultivation, vide DeWildeman, Pl. Util. Inter. 556–557. 1903.

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rollula composita, quandoque radiata, radis octo ligulatis, albis." Thus it is seen that he really included also the plants with white rays, forms which today are separately treated as *B. pilosa* var. *radiata* Schz. Bip.[1]

An original specimen of *B. ciliata* Hoffmgg. is in the collection of the younger Reichenbach at the Museum of Vienna. It was collected by Dr. Hoffmannsegg. It is a nearly glabrous plant, with discoid heads, and is typical *B. pilosa* L. In the original description it was differentiated from *B. pilosa* because of its polymorphous leaves, a character of no value here, since *B. pilosa* L., *B. subalternans* DC., and most other species of *Bidens* display a noticeable,sometimes very high degree of foliar polymorphism.

A sheet bearing two type specimens of *B. Montaubanii* Phil. is in Berlin (Berl.). These were received from Philippi. They display, in the narrowness of their leaflets, a superficial resemblance to certain specimens of the South American *B. subalternans* DC., but differ in having leaves pinnate, not bipinnate, and the achenes 2-aristate, not 2–4-aristate. A study of their foliage, achenes, and involucres shows that they are mere foliage forms of *B. pilosa* L.

Bidens pilosa var. *β.* **minor** (Bl.) Sherff, Bot. Gaz. 80: 387. 1925. Pl. CII, figs. *c*, *d*, and *k–r*.

Coreopsis leucorrhiza Lour. Fl. Coch. ed. 1. 508. 1790 (ex descript. et patria).

Coreopsis leucorhiza Lour. op. cit. ed. 2. 622. 1793 (ex descript. et patria).

Bidens hispida H.B.K. Nov. Gen. et Sp. 4: 186 (237). 1820.

Kerneria dubia Cass. Dict. Sci. Nat. 24: 398. 1822 (pro parte).

Bidens sundaica Blume, Bijdr. 913. 1826.

Bidens sundaica var. *minor* Blume, op. cit. 914.

Bidens (?) *leucorhiza* (Lour.) DC. Prodr. 5: 605. 1836.

Bidens leucantha var. *sundaica* (Bl.) Hasskarl, Cat. Pl. Hort. Bog. 100. 1844; etiam in Miquel, Fl. Ned. 2: 77. 1856–1859.

Bidens andicola var. *β.* Wedd. Chlor. And. 1: 70. 1855 (ex synon. H.B.K.).

Bidens sundiaca Bl. ex Ind. Kew. 1: 301. 1895 (sphalm).

Bidens aurantiaca Colenso, Trans. New Zeal. Inst. 27: 388. 1895.

Bidens africana Klatt, Bull. Herb. Boiss. 4: 464. 1896.

[1] For an extended discussion of Vellozo and his work, see Hook. Journ. Bot. 4: 4. 1842.

Bidens pilosa var. *brevifoliata* Hieron. Bot. Jahrb. 29: 48. 1900.

Bidens pilosa var. *dubia* (Cass.) O. E. Schulz in Urban, Symb. Antill. 7: 135. 1911.[1]

Foliola saepius acriter apicata et acriter serrata. Capitula subradiata. Flores ligulati 4–7, albidi vel sulphurei vel vivi saepe etiam aurei, supra irregulariter 3–5-lobulati, circ. 5–8 mm. longi, stylo deficiente vel 2 mm. longo ramis inaequilongis, ovario circ. 1 mm. longo plerumque 2- vel 3-aristato aristis 1–2 mm. longis.

Type specimen: See discussion below.

Distribution: Throughout most tropical and subtropical regions; in Central America and South America to Chile and Argentina; frequent in the West Indies; found over the entire continent of Africa; occurring in southeastern and southern Asia, Burma, etc.; in Japan, Formosa, Ceylon, Australia, New Zealand, etc.; in many of the East Indies and in widely separated insular localities of the Atlantic, Pacific, and Indian oceans.

Specimens examined: *D. J. Anderson* (*Yunnan Exped.*), China, March 19, 1868 (Boiss.); *anon.*, St. Croix, West Indies (Cop.); *anon.*, Kamwake-mura, Isl. Shikoku, Prov. Tosa, Japan, Nov. 23, 1896 (Berl.; sub nom. var. *albiflora* Maxim.); *F. Bachmann* 1585, 1588, and 1589, Pondoland, southeastern Africa, 1887–1888 (Berl.); *J. Ball*, alt. 450–1,800 meters, in valley of Rímac River, Peru, April, 1882 (Kew); *Aug. Barbey*, Baliagata, Calcutta, India, April 10, 1891 (Boiss.); *G. L. Bates* 39, Batanga, Kamerun, March 2, 1895 (Boiss.); *G. Baur* 111, Chatham Isl., Galapagos Isls., June, 1891 (Gray); *Bertero* 444, Quillota, Chile, September, 1829 (Del.); *Blanchet* 143, Bahia, Brazil (Del., 2 sheets); *Blume*, Java (Leyd., 2 sheets); *idem*, eodem loco (Leyd., sub nom. *Bidente sundaica* et *B. sundaica* var.); *idem*, eodem loco, 1836 (Brit.; Del.; Par.; Webb; sub nom. *Bidente sundaica* Bl.); idem 139, eodem loco (Brit., sub nom. *Bidente leucantha* var. *sundaica* Hassk.); *F. R. Bona* 131, Malaya Mts., Lepanto Subprov., Luzon, Philippine Isls., November–December, 1911 (Man.); *W. E. Broadway* 2280, common in ditches, Cangiehel, Santa Cruz, Trinidad, West Indies, August 11, 1908 (Field; Man.); *Otto Buchtien*, alt. 2,450 meters, Cotaña, Bolivia, November, 1911 (Field); *idem* 5629, alt. 1,400 meters, above the road to Tipuani, Bolivia, February, 1920 (Field; U.S.); *W. Busse* 939, Upper Ngaka Valley, German East Africa, 1901 (Berl.); *idem* 2480, Tand-ngongóro, Distr. Trindi, German East Africa, May 13, 1903 (Berl.); *D. R.*

[1] Regarding *Bidens pinnata* Nor. (nomen), which applies perhaps equally to *B. pilosa* var. *minor* and to *B. biternata*, see under *B. biternata*.

BIDENS BRASILIENSIS Sherff

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Büttner 29, Togo, Guinea, July 31, 1890 (Berl.); *J. Cardosa* 244, Cape Verde Isls., 1895 (Berl.); *J. Cavalerie* 3697, in cultivated places, Pin-Fa, China, August 20, 1907 (Del.); *Mrs. Evelyn Cecil* 21, between Beira and Massi Kessi, Portuguese East Africa (Kew); *Tang Chung Chang* et al. 2859, grassy lawn, Fukien Christian Univ. Campus, Foochow, Fukien Prov., China, October 7, 1925 (Calif.); *T. F. Cheeseman* 30, Sunday Isl., Kermadec Isls., August, 1887 (Kew); *J. & M. S. Clemens* 4177, Hue Divide, Tourane, Annam, French Indo-China, July, 1927 (Calif.); *W. Colenso*, New Zealand, communic. 1897 (Kew, sub nom. *Bidente aurantiaca* Col.); *Paul Conrath* 395, Nodderfontein, Transvaal, 1896 (Berl.); *Alice C. Cook* 25, wet places, ravine (barranca) near Guía, Gran Canaria, Canary Isls., December, 1893 (Field); *T. Cooper* 1152, Natal, 1862 (Mus. V., 2 sheets); *H. M. Curran* 5019, Mt. Tonglon, Prov. Benguet, Luzon, Philippine Isls., August, 1906 (Mo.); *DeVore & Hoover* 260, lowland, Santa Cruz, Distr. Davao, Mindanao, Philippine Isls., April 28, 1903 (Man.); *Deschamps*, Ceylon, 1891 (Del.); *Dinklage* 2117, Grand Bassa, Liberia, October 15, 1899 (Berl.; Gray); *Drège* 5084, South Africa (Berl.); *W. Dudgeon & L. A. Kenoyer* 426, alt. 1,200 meters, Himalaya Mts., India, May 30, 1920 (Mo.); *Eggers* 208, alt. 330 meters, Signal Hill, St. Thomas, West Indies, December, 1880 (Berl., 2 sheets; Boiss.; Del., 2 sheets; Kew, 2 sheets; Mun., 2 sheets; U.V., 2 sheets); *idem* 6251, infrequent on shore between Mt. Felix and Goyave, Grenada, West Indies, December 9, 1889 (Berl.); *idem* 7218, Forster's Hall Wood, Barbados, West Indies, January 24, 1890 (Berl.); *Ehrenreich*, Ceylon, May 18, 1893 (Berl.); *A. D. E. Elmer* 5769, Baguio, Prov. Benguet, Luzon, Philippine Isls., February 29, 1904 (Berl.; Boiss.; Man.); *Ernest Faber*, Tung-kun, southern China (Del.); *A. Fendler* 695 pro parte, near Tovar, Venezuela, 1854–1855 (Del.; Kew); *E. Fenix*, Baguio, Prov. Benguet, Luzon, Philippine Isls., December 5, 1910 (Man.; floris radicibusque faciendo Igaroteorum vini "sinisit" dicti lectis); *Fraser*, Ecuador, 1860 (Del.); *Claude Gay*, Chile (Berl.; Del., 2 sheets; Mus. V.); *idem*, Prov. Coquimbo, Chile, 1839 (Del.); *O. Gelert*, Arucas, Gran Canaria, Canary Isls., April 22, 1897 (Cop.); *A. Glaziou* 4034, Brazil (Cop.); *Hance* 299, Hongkong, China (Gray); *J. W. Harshberger*, Pembroke Church, Bermuda, June 21, 1905 (Gray; Mo.); *G. T. Hastings* 570, in garden, Santiago, Chile, March, 1902 (Calif.); *O. Haught* 4, Talara, Prov. Paita, Peru, 1925 (Field); *Aug. Henry* 75, Hongkong, China (Mo.); *idem* 108, Formosa (Mo.); *idem* 8769, Isl. Hainan, southeastern China, November, 1889 (Gray); *Fr. Hens*

91, alt. 100–600 meters, Lutété, Belgian Congo, February 1, 1888 (Del.); *idem* 94, alt. 500–600 meters, eodem loco, February 20, 1888 (Del.); *idem* 261, alt. 150–600 meters, eodem loco, February 1, 1888 (Boiss.; U.V.); *J. M. Hildebrandt* 1023, sterile ground, Zanzibar, October–November, 1873 (Berl.; Mus. V., 2 sheets); *idem* 1640, Isl. Johanna (Isl. Anjouan), Comoro (Comore) Isls., June–August, 1875 (Berl.; Mus. V., 2 sheets); *William Hillebrand* 41, Makawao, eastern Maui, Hawaiian Isls. (Kew); *C. Hoffmann* 250, San José, Costa Rica, September, 1854 (Berl.); *Fr. Holl*, along stream near Funchal, Madeira, cum specie ipsa, September 12, 1827 (Mus. V., 3 sheets); *C. Holst* 4328, Gonja, Distr. Usambara, German East Africa, September, 1893 (Kew; Mus. V.); *I. F. Holton*, La Paila, Dept. Cauca, Colombia, May 19, 1853 (Del.); *J. D. Hooker*, alt. up to 1,500 meters, Sikkim, India (Berl.; Cop.; Del.; Gray); *idem & T. Thomson*, alt. 1,200–1,500 meters, Mt. Khasia, India (Boiss.; Mus. V., 2 sheets); *C. C. Hosseus* "498a^x," alt. 1,050 meters, Doi-Sutep, Siam, April 14, 1905 (Mun.); *Hügel*, New Zealand (Mus. V.); *Abdul Huk*, Fort Stedman, Upper Burma, December, 1892 (Mus. V.); *Humboldt & Bonpland*, Caracas, Venezuela (Par., sub mss. No. 698 et nom. *Bidente hispida*); *E. Jahandiez*, Bufadero, Teneriffe, Canary Isls., January 6, 1911 (Boiss.); *Pedro Jörgensen*, Mendoza, Argentina, 1908 (Cop.); *Junghuhn* 290, Java (Gray); *idem* 311, Java (Gray); *idem* 357, Mt. Dieng, Java (Gray; Leyd.); *idem* 376 (Gray); *H. Junod*, Delagoa Bay, Mozambique, 1890 (Boiss.); *Kandt* 105, alt. 1,700 meters, Mt. Niansa, Ruanda, German East Africa, 1906 (Berl., 2 sheets); *A. F. G. Kerr* 743, alt. 720 meters, Djing-Mai (Chieng-Mai), Doi-Sutep, Siam, August 8, 1909 (Berl.); *R. Landauer*, Mariannhill, Natal (Berl.); *LeGuillon*, Raffles Bay, north coast of Australia, 1841 (Par.); *idem*, Java, 1841 (Par.); *idem*, Akaroa, Banks Peninsula, Middle Isl., New Zealand, 1841 (Par.); *Lehmann* 58, Lindanglaja, west Java, February, 1890 (Berl.); *Leschenault*, Ceylon, 1823 (Del.); *A. Letourneux*, in marshes, banks of Lake Mariot (Lake Mariut), Egypt, June, 1876 (Cop., 2 sheets); *C. O. Levine* 278, Honam Isl., Prov. Kwangtung, China, October 1, 1917 (Mo.); *J. A. Lörzing* 153, alt. about 1,650 meters, north Sendara, central Java, January 25, 1912 (Berl.; nom. vernac., Kettul); *H. Lynes* 23, alt. 1,950 meters, Nuiruya, Jebel Marra (Marrah Mts.), Darfur, Sudan, February, 1922 (Kew); *J. F. Macbride* 2898, weed of fields, railway grades, etc., alt. about 2,400 meters, Matucana, Peru, March 14–18, 1923 (Field); *idem* 3179, alt. about 2,100 meters, stony river-flat, Ambo, Peru, April 5, 1923 (Field); *G. Mandon* 134, grav-

BIDENS RIEDELII Baker (figs. *a–k*); var. HASSLERIANA Chod. (fig. *l*)

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elly and rocky places near Funchal, Madeira, February, 1865 (Berl.; Boiss.; Del., 2 sheets; Mus. V., 2 sheets; plantae speciei ipsi adpropinquantes); *Manggerai* 22, Isl. Flores, Dutch East Indies, August 28, 1918 (Buit.); *Martius* 819, Brazil (Mus. V.); *idem* 842, Brazil (Berl.); *Maximowicz*, Oahu, Hawaiian Isls., 1854 (Kew); *R. C. McGregor*, Dupax, Prov. Nueva Vizcaya, Luzon, Philippine Isls., March–April, 1912 (Carn.; Field); *idem* 861, Lutab to Kabayan, Prov. Benguet, Luzon, June, 1909 (Man.); *idem* 3637, Prov. Nueva Vizcaya, Luzon, January 15, 1913 (Man.); *idem* 3865, Mt. Polis, Subprov. Ifugao, Luzon, February 1, 1913 (Man.); *A. Meebold*, alt. 600 meters, Kandy, Ceylon, March, 1905 (Berl.); *E. D. Merrill*, Prov. Benguet, Luzon, Philippine Isls., October–November, 1905 (Berl.); *idem*, Honam Isl., Kwangtung Prov., October 13–November 9, 1916 (Calif., 2 sheets; nom. sinensi, Kam p'un ngan chan); *idem* 1781, alt. 1,200–1,400 meters, open, disturbed soil of railway grade, Baguio, Benguet Subprov., Luzon, May 12, 1914 (Man.; Mo.); *idem* 6548, Mt. Pulog, Prov. Benguet, Luzon, May, 1909 (Man.); *idem* 6988, alt. 1,725 meters, thickets at old crater of Canlaon Volcano, Negros, Philippine Isls., April, 1910 (Field; Man.); *C. F. Millspaugh* 81, Walsingham, Bermuda, December 31, 1898 (Field); *Milne*, waste places, Isle of Pines, October, 1853 (Kew); *A. Mocquerys* 44, San Thomé, Roça Ledroma, Portuguese West Africa, 1899 (Del.); *R. P. Murray*, Teror, Gran Canaria, Canary Isls., May 13, 1892 (Boiss.); *G. Nakahara* 283, Formosa, August, 1905 (Man.); *F. G. Overlaet*, Kafakumba, Belgian Congo, April, 1925 (Field, 3 sheets); *L. R. Parodi* 7305, Palermo, Buenos Aires, Argentina, October 16, 1926 (Gray); *idem* 7309, eodem loco, October 17, 1926 (Gray); *A. Pételot* 129, edges of roads, Cho Ganh, French Indo-China, April, 1920 (Calif.); *Peters* 8 and 79, Mozambique (Berl.); *C. J. Pitard* 189, Barranco de Bufadero, Teneriffe, Canary Isls., March 18, 1905 (Berl.; Mo.; var. *radiatae* adpropinquans); *H. Pittier* 683 and 684, alt. 1,500–1,900 meters, Cuesta de Tocotá, road from Buenaventura to Calí, western Cordilleras, Cauca, Colombia, December, 1905 (U.S.); *idem* 980, prairies, La Uruca, Costa Rica, February, 1888 (Boiss.); *idem* 3031, Costa Rica, 1890 (Boiss.); *idem* 6990, alt. 1,500 meters, San Rafael de Cartago, Costa Rica, August 28, 1892 (Berl.); *H. Polakowsky* 362, San José, Costa Rica, November, 1875 (Berl.); *Von Prittwitz und Gaffron* 272, Lager, German East Africa, July 7–8, 1901 (Berl.); *Máximo Ramos* 5550, Río Trinidad, Benguet Prov., Luzon, December 12, 1908 (Berl.; Man.); *Dr. & Mrs. J. N. Rose* 18740 p.p., Santa Clara, Peru, July 18,

1914 (U.S.); *H. H. Rusby* 1620, Tacna, Chile, March, 1885 (N.Y.; Phila.); *K. Saida*, Tokyo, Japan (Berl.); *A. Saulière*, alt. 2,115 meters, Kodai-kanal, Pulney Hills, Madura District, Presidency of Madras, India (Man.); *F. Schickendantz* 127, Fuerte de Andalgalá, Prov. Catamarca, Argentina, May, 1879 (Berl.); *Rudolph Schlechter* 2133, alt. 230 meters, Zuurbraak, Cape Colony, January 19, 1893 (Berl.; Boiss.; Kew; Mus. V.; U.V.); *G. Schweinfurth* 112, Nile Valley, Egypt, 1887 (Berl.); *idem* 419 p.p., vicinity of Cairo, Egypt, September 25, 1864 (Berl., 2 sheets; Boiss.; Mus. V.); *Berthold Seemann* 2265, Oahu, Hawaiian Isls., 1850 (Kew); *Eduard & Caecilie Seler* 2692 and 2694, Chaculá, Dept. Huehuetenango, Guatemala, August 20, 1896 (Berl.); *E. E. Sherff* 2043, cult., Chicago, Illinois, October 7, 1915, e seminibus e Horto Bot. Raoul., Papeete, Tahiti (Field); *A. Sodiro* 4314 (43/4 fide Hieronymi), Ecuador (Berl., 2 sheets; type material of *Bidens pilosa* var. *brevifoliata* Hieron.); *Mary F. Spencer*, alt. 100 meters, Taormina, Sicily, January–February, 1904 (Gray); *Ad. Stolz* 627, alt. 600–1,500 meters, Kyimbila, Nrulila (vicinity of Langenburg at north end of Lake Nyassa), Nyassa Highland, March 8, 1911 (Berl., 2 sheets; Cop.; Del., 3 sheets; Mus. V.); *R. Strachey & J. E. Winterbottom* 2, alt. 1,110 meters, Ramgungu River, Kumaon, India (Brit.; Kew); *Stuhlmann* 9624, Uluguru, German East Africa, November 20, 1894 (Berl.); *Styles*, Chile (Phila.); *Fedor Tagor* 384, Java, 1859 (Berl.); *T. Thomson* 869, Kumaon, India, May–June, 1845 (Kew, 2 sheets); *Thwaites* 3630, Ceylon (Boiss.; Del.); *Ad. Tonduz* 498, alt. 1,752 meters, orillas de la Laguna de Caldera, Volcán de Pacaya, Guatemala, April 6, 1921 (Mo.); *idem* 695, roads and plantings at San José, Costa Rica, June, 1892 (Boiss.); *William Trelease* 437, São Jorge, Azores, June 23, 1894 (Mo.); *E. Ule* 835, weed in fields, Blumenau, Santa Catharina, Brazil, August, 1888 (Berl.); *idem* 4493, roadsides, State of Rio de Janeiro, Brazil, August, 1897 (Berl.); *Vahl*, Ribeira de Fayal, Madeira, August 5, 1901 (Cop.); *S. Venturi* 8810, alt. 1,200 meters, Cerro el Noglito, Dept. Burroyaco, Prov. Tucumán, Argentina, April 12, 1929 (Gray); *Verreaux* 532, Australia, 1845–1846 (Par., 2 sheets); *Seb. Vidal*, Miagao, Prov. Ilo-ilo, Panay, Philippine Isls. (Kew); *idem* 1514, 3133, and 3138, northern Luzon, Philippine Isls. (Kew); *Voeltzkow* 211, Comoro Isls., 1903 (Berl.); *G. Volkens* 682, alt. 1,550 meters, Kilimanjaro region, German East Africa, August 15, 1893 (Berl.; Boiss.; Kew); *Walker*, Ceylon (Del.); *Warburg* 413, Bombay, India (Berl.); *idem* 418, Nilgiri Hills, India (Berl.); *Wawra* 353, Ascension Isl., east Atlantic, 1857–1858 (Mus. V.); *Welwitsch* 3959, Distr. Golungo Alto,

BIDENS CHODATI Hassl.

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Angola (Cop.); *Alexander Whyte*, alt. 1,050–1,200 meters, Tanganyika Plateau, July, 1896 (Kew); *idem*, alt. 1,950–2,100 meters, Masuku (Masukwo) Plateau, northwest of Lake Nyassa, eodem tempore (Kew); *Wichura* 2200, Gedang Bendang, Java, November 21, 1861 (Berl.); *F. Wilms* 844, Lydenburg, Transvaal, December, 1887 (Berl.; Del.; Kew); *Charles Wright*, Hongkong, China, 1853–1856 (Gray); *idem*, Loo-Choo Isls., 1853–1856 (Gray; U.S.); *Zech.* 276, Kratschi, Togo, 1900 (Berl.); *H. Zollinger* 401, Java (Del., 3 sheets; Par.); idem 816, eodem loco (Del., 2 sheets; Par.).

Bidens pilosa L. has among its various varieties and formae a subradiate variety, widely distributed in both hemispheres. This was observed by Cassini.[1] O. E. Schulz (loc. cit.) has employed for it the varietal name *dubia*, but the synonymous *Bidens sundaica* Bl. had already been reduced to varietal rank by Hasskarl (loc. cit.) in 1844, and so takes precedence over the name *dubia*. In his original description Blume (loc. cit.) listed a variety *minor*, "caule foliisque humilioribus. Crescit: cum praecedente [i.e., *B. sundaica* ips., prope Buitenzorg, Java]." Recently, through the kindness of Dr. J. W. C. Goethart, Director of the Royal Herbarium at Leyden, I was privileged to examine early specimens by Blume and by Junghuhn, from Java. Three sheets (Nos. 900,146 . . . 72 pro parte; 900,146 . . . 73; 900,146 . . . 75) bear excellent specimens of Blume's *Bidens sundaica*. A few minute rays are present. The first of these sheets bears also the basal part of a specimen (and a fruiting branch which probably belonged to it), labeled unmistakably in Blume's own handwriting, *"Bidens Sundaica Variet."* Dr. Goethart (in lit.) very properly regards this as "probably type of var. *minor*." The one fruiting head still attached to the rather depauperate basal portion exactly matches the others on the *B. sundaica* plants. A fourth sheet bears still more depauperate material collected by Dr. Fr. Junghuhn, No. 357, on Mt. Dieng, Java. It is labeled in Miquel's[2] handwriting (fide Goethartii in lit.) as a depauperate forma of *B. sundaica* Bl. Indeed, its three specimens (one of them, in flower,

[1] ". . . les calathides, composées d'un disque jaune et d'une couronne blanchâtre, sont larges de cinq lignes. . . . Nous avons observé, pendant plusiers années, des individus vivans de cette espèce, cultivés au Jardin du Roi, et nous avons remarqué que leurs calathides etoient le plus souvent incouronées, rarement radiées. Dans ce dernier cas, la couronne étoit composée de cinq à sept fleurs, dont la corolle avoit le tube court, et la languette courte, large, orbiculaire, tridentée au sommet, multinervée, a nervures jaunâtres. . . . "—Cassini, loc. cit.

[2] Miquel (loc. cit.) cites a depauperate form collected by Junghuhn: "*B. leucantha β. sundaica* Hassk. l.c. p. 100, cujus auctoritate formam hanc alioquin satis constantem huc retuli.—Formam omnibus partibus depauperatam in elevatioribus montanis Javae insulae cl. *Jungh.* legit."

having the tiny rays very evident) are so obviously a merely less developed form of *B. sundaica*, that few if any authors today would seek to draw any distinctions.

It is evident that the actually equivalent name *minor*, given varietal status long before the name *sundaica* was, must in turn take precedence, supplanting both *sundaica* and *dubia*.[1]

Blume's description, "B. floribus subradiatis . . . " is matched by upwards of a thousand specimens examined in the past few years. It is represented in particular by several of Blume's own specimens (Brit., sub numero 139; Del.; Par.; Webb). In the Delessert, Paris, and Webb herbaria the heads are mostly rayless, perhaps having had the few rays removed in previous examinations. The foliage aspect, however, is definitely that of the ordinary subradiate variety. Furthermore, the plant at the British Museum of Natural History is definitely subradiate.[2]

Even earlier than Blume's var. *minor* is *Bidens pilosa* var. *chinensis* L. Mantiss. Pl. 281. 1771, a name omitted from the foregoing list of synonyms.[3] Linnaeus' original description follows: "Habitat in India orientali. H.U. Planta simillima Bid. pilosae, si non eadem, sed radio diversa. Folia supra nuda, sicca ut fere scariosa. Flosculi marginales nivei (nec albi) tamen hermaphroditi fertiles; primo anno sati erant conformes flosculis disci, nec majores, altero anno erant radio explanato quinquefloro plano parvo. Semina radii aristis 4. s. 5, quae in B. pilosa vulgari radiis 2. s. 3."

It is seen that the Linnean plants, in the first year of their sowing (they were annuals of course), had no ray flowers and thus were typical *B. pilosa*. In a subsequent year, five small rays appeared. It would seem that if Linnaeus' observations were flawless, and not founded upon confused forms, the reason for distinguishing our *minor* varietally (i.e., its constancy) would automatically disappear. If we consider, however, the color of the rays in the later plants, it is seen that some were glistening- or snowy-white while some were

[1] Cf. O. E. Schulz (Bot. Jahrb. 50, Suppl. 179. 1914), ". . . dagegen gehören *B. sundaicus* . . . und var. *minor* . . . wahrscheinlich zu *B. pilosus* L. var. *dubius* (Cass.) O. E. S." In herbarium determinations, I have not differentiated between forms having or lacking aristae on the ovaries of the ligulate florets.

[2] In my cultural observations the var. *minor* appeared to come very true to a given type. For example, in some two dozen plants (*Sherff* 2043) raised in 1915 from achenes on specimens sent by Mr. St. Ahnne (Bot. Gard. Raoul, Papeete, Tahiti), the hundreds of flowering heads had uniformly tiny, distinctly yellowish, ligulate florets, as had been observed on the parent material.

[3] As also its equivalent, *Glossogyne chinensis* (L.) Less. Syn. Composit. 212. 1832.

BIDENS ANGUSTISSIMA H.B.K. (figs. *h–m*); var. LINIFOLIA
(Schz. Bip. *ex* Klatt) Sherff (figs. *a–g*)

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other shades.[1] My field and herbarium observations indicate a pronounced constancy in the ray color for any one collection of plants of var. *minor*. Therefore, it appears probable that some of the smaller-rayed forms of *B. pilosa* var. *radiata* composed at least a part of the later material examined by Linnaeus. His herbarium affords no help in solving the matter.[2] Surely, there is so much of uncertainty in the application of the Linnean concept that it appears unwise to adopt it as against the clear and certain concept associated with the varietal name *minor*.[3]

Bidens aurantiaca Colenso has its description ("Florets . . . small, bright dark orange: ray-few, . . . ") supplemented by the authentic Colenso specimen at Kew. This has the one flowering head now lacking rays, but the aspect of the various critical structures is more properly that of the variety *minor* than of *B. pilosa* proper.

Klatt's type of *B. africana*, as already pointed out (Bot. Gaz. 85: 14. 1928), was a plant collected by Dr. C. Keller, on Reunion Island, summer of 1886. The herbarium containing the type was not cited nor have I succeeded in locating an authentic specimen. At Gray Herbarium are various tracings by Klatt, which form an important part of the Klatt Herbarium obtained by that institution some years ago. One of these is of *B. africana*. The plant represented is seen to be widely remote from *B. Lantanoides* Gray and *B. hawaiensis* Gray, with which Klatt compared it in his original description. The tracing, construed with Klatt's description (" . . . Die eiförmigen Strahlblüten sind 2–3 mm. lang . . . "), shows that the plant was, beyond all reasonable doubt, merely a simple-leaved form of *B. pilosa* var. *minor*.

Bidens pilosa var. *β*. **minor** f. 1. **umbrosa** Sherff,
Bot. Gaz. 90: 394. 1930.

Herba gracilis. Folia valde membranacea, 3–5-partita foliolis ovatis vel rhomboideo-ovatis, paucidentatis. Capitula minute radiata, pansa ad anthesin tantum circ. 6–7 mm. lata et 5–6 mm. alta.

[1] I assume that "nivei (nec albi)" is not a misprint and construe it in apparently the only permissible way: "snowy-white (also, not white)."

[2] There are four sheets pinned together; one, correctly labeled *Bidens pilosa;* a second, labeled "*B. pilosa* variety" and determined by me as *B. pilosa;* a third, from the Hortus Upsalensis, with merely the inscription "Radio albo," and belonging to *B. pilosa* var. *minor;* a fourth, with the inscription (on back of sheet, "Rumph. amb. 6, *t.* 15") and identified by me as *B. pilosa.*

[3] It may be noted that O. E. Schulz has likewise declined, in his writings upon *Bidens*, to adopt the name *chinensis* for this variety.

Flores ligulati circ. 4 vel 5, flavidi, circ. 4 mm. longi. Achaenia circ. 18–24, linearia, nigra, biaristata, 6–10 exteriora clavata atro-rubida corpore tantum circ. 4–5 mm. longa aristis demum saepe caducis, interiora nigra magis attenuata corpore 9–14 mm. longa.

Type specimen: Collected by *Christian Julius Wilhelm Schiede*, in shady places between Las Trojes and Hacienda de la Trinidad, State of Michoacán, Mexico, October (Berl.).

Distribution: Known only from type locality in State of Michoacán, Mexico.

Specimens examined: *Schiede* (type and 2 cotype specimens, Berl.).

Bidens pilosa var. γ. **radiata** Schz. Bip. in Barker-Webb & Berthelot, Hist. Canar. III, 2[II]: 242. 1836–1850. Pl. CIII, figs. *a–h*.

Coreopsis leucanthema L. Amoen. Acad. 4: 291. 1759 (exclud. syn. Tournef.); Syst. Nat. ed. 10. 2: 1228. 1759.

Coreopsis coronata L. Sp. Pl. ed. 2. 2: 1281 (ex syn. Vaill. et Plum. sed non ex descript. vel patria).

Coreopsis leucantha L. op. cit. 1282.

Kerneria tetragona Moench, Meth. 595. 1794 (ex descript.).

Bidens leucantha (L.) Willd. Sp. Pl. 3: 1719. 1804.

Kerneria leucantha (L.) Cass. Dict. Sci. Nat. 24: 398. 1822.

Bidens abortiva Schum. & Thonn. Beskr. Guin. Pl. 155 (381). 1827 (ex descript.).

Bidens adhaerescens Vell. Fl. Flum. 348, 8, *pl. 88*. 1827 (pro parte).[1]

Bidens striata Sweet, Brit. Fl. Gard. ser. 1. 3, *pl. 237*. 1828.

Bidens oxyodonta DC. Prodr. 5: 600. 1836.

Bidens pilosa f. *radiata* Schz. Bip. in Krauss, Beitr. Fl. Cap. Natal. 77. 1846 (ex synon. *B. leucantha* Willd., excl. plantam Kraussii quae *B. biternata* var. *glabrata* f. *abyssinica* est).

Bidens pilosa var. *leucantha* (L.) Harv. Fl. Cap. 3: 133. 1865; cf. O. Hoffm. in Engler & Prantl, Nat. Pflanzenfam. IV, 5: 244. 1890.

Kerneria pilosa var. *radiata* (Schz. Bip.) Lowe, Man. Fl. Madeira 1: 474. 1868.

Bidens pilosa var. *leucantha* f. *subsimplicifolia*, f. *ternata*, f. *pilosior*, and f. *subbiternata* O. Ktze. Rev. Gen. 1: 322. 1891.[2]

[1] For treatment of *B. adhaerescens* see under *B. pilosa* proper. This name was spelled *B. adherescens* on the plate cited (*pl. 88*).

[2] At least as to his synoptical arrangement of forms. The descriptions given by Kuntze are hasty and inadequate; they do not admit of identification. Nor

BIDENS ANDICOLA H.B.K. (figs. *a–d*, *h–p*); var. COSMANTHA (Griseb.) Sherff (fig. *e*); var. DECOMPOSITA O. Ktze. (figs. *f*, *g*)

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Acocotli quauhuahuacensis Hernández ex Mat. Med. Mex. 2: 154. 1898 (pro parte; cf. var. *bimucronatam*).

Bidens pilosa var. *humilis* Walp. ex Reiche, Fl. Chile 4: 102. 1905 (*Bidens leucantha* var. β. Meyen & Walp. Nov. Act. Acad. Caes. Leop. Carol. 19, Suppl. 1: 271. 1843).[1]

Bidens leucanthema (L.) Krause in Sturm, Fl. Deutsch. ed. 2. 13: 159. 1905.

Bidens pilosa subvar. *radiata* (Schz. Bip.) Pitard ex Pitard & Proust, Iles Canar. Fl. de Archipel. 226. 1908.

Bidens Wallichii var. *albiflora* Max. ex Matsum. Ind. Pl. Jap. 2, pt. 2: 631. 1912 (ex syn. *B. leucantha* Willd.).

Bidens pilosa var. *albiflora* Max. in Somoku Dzusetsu, ed. Makino (Iconogr. Pl. Nippon) 15: *pl. 58*. 1912.

a. Caules vel rami inferiores plerumque decumbentes.

b. Caules magni, demum 1.5–3 m. longi.....f. 3. *decumbens*.

b. Caules parvi, plerumque 1–3 dm. longi.....f. 2. *Dondiaefolia*.

a. Planta erecta.

b. Folia plerumque 3–5-partita.....var. *radiata* sensu stricto.

b. Folia indivisa.....f. 1. *indivisa*.

Caulis parum humilior, foliorum foliolis forsan saepius ovatis. Capitula radiata, pansa ad anthesin 1.5–3 cm. lata et 7–9 mm. alta. Flores ligulati 5 vel 6, ligula elliptico-obovati, apice subtruncati, albi vel luteoli, saepe nervis purpurascentibus percursi vel raro omnino rosacei vel purpurascentes, 0.7–1.5 cm. longi. Achaenia plerumque breviora, 5–9 (rarissime –12) mm. longa. Aliter a specie videtur non differe.

Type specimen: Collected somewhere in America, the exact locality not stated. See discussion below.

Distribution: Abundant in Florida; occurring infrequently in Louisiana, Arizona, and California; distributed widely through Mexico, Central America, and South America to Chile and southernmost Brazil; in Cuba, Haiti, Puerto Rico, Jamaica, and on many other islands of the West Indies; in Africa scattered from Egypt,

can they always be definitely applied on having recourse to Kuntze's herbarium specimens (e.g., in Herb. N. Y.), as he labeled his plants so carelessly that widely different forms are found to have been given the same name (cf. O. E. Schulz, Urban, Symb. Antill. 7: 139. 1911: "Sine dubio pleraque specimina ab O. Kuntze l.c. commemorata ad species propinquas pertinent").

[1] Original description inadequate: "β, humilis, spithamaea, foliis plerisque simplicibus, paucis uniiugis, capitulis solitariis. Brasilia: Rio de Ianeiro." Reference to var. *radiata* is made here solely because the original description was set by its authors (Meyen and Walpers) under "*Bidens leucantha* Willd."

Tunis, etc., southward through British East Africa, Dar-fur of the Sudan, Rhodesia, etc., to the Cape of Good Hope; in Asia from Corea southward through China to Siam and westward into British East India; also in the Liu-kiu Islands, the Canary Islands, and many other insular groups of tropical regions.[1] Rarely adventive on ballast, etc., outside its natural range (e.g., Philadelphia, Pennsylvania).

Specimens examined: *R. C. Alexander*, Diablo, Jamaica, 1849 (Kew) and 1850 (Gray; Kew); *anon.* (Linn., sub nom. *Leucanthema radio albo*); *anon.*, Navy Yard, Philadelphia, Pennsylvania, September, 1868 (Phila.); *A. A. Baldwin* 47, Merritt's Isl., Florida, December 17, 1892 (Penn.); *Gust. Bernoulli* 1205, Chojojá near Mazatenango, Guatemala, December, 1870 (Berl.; Del.; Kew; N.Y.); *Bernoulli & Cario* 1492, eodem loco et tempore (Berl.; Kew); *iidem* 1552, Quezaltenango, Guatemala, July, 1876 (Kew); *Bertero*, Isl. Santo Domingo (Berl.; Del.; type material of *Bidens oxyodonta* DC.); *idem* 844, Quillota, Chile (Del.); *Bitting* 1297, Ovedo, Florida, March 13, 1892 (Field); *J. C. Blumer* 2144, alt. 1,680 meters, Wilgus Ranch, Chiricahua Mts., Arizona, September 4, 1907 (Field); *B. G. C. Bolland* 6, Meadi, Cairo, Egypt, January 10, 1913 (Kew); *Charles Bolle*, Teneriffe, Canary Isls., November 17, 1851 (Berl.; var. *minori* adpropinquans); *Joseph Bornmüller* 2437, Santa Cruz, Palma, Canary Isls., April 24, 1901 (Del; Mo.; Phila.); *Mateo Botteri*, Mexico, in 1856 (Del., 2 sheets); *E. Bourgeau* 215 pro parte, somewhat moist places, Mesa de Mota, Teneriffe, Canary Isls., January 23, 1845 (Kew; var. *minori* adpropinquans); *idem* 847 pro parte, moist fields, St. Sebastián, Gomera, Canary Isls., April 11, 1849 (Del.); *idem* 2253, Valley of Córdoba, Vera Cruz, Mexico, in 1866 (Kew); *idem* 2561, abundant at Orizaba, Mexico, July 8, 1866 (Del., 2 sheets; Kew); *idem* 2681, region of Orizaba, Mexico, July 17, 1866 (Berl.; Cop.; Gray; Kew; U.S.); *L. J. K. Brace* 1946, Cherokee (Cheroki) Sound, Great Abaco Isl., Bahamas, December 29, 1904 (Field); *idem* 5091, Andros Isl., Bahamas, August 18–September 10, 1906 (Field); *A. C. Brade* 2167, Tablazo, Costa Rica, December 21, 1908 (Berl.); *N. L. & E. G. Britton & J. A. Shafer* 158, Tampa, Florida, March 7–8, 1903 (Carn.); *N. L. Britton & C. F. Millspaugh* 2596, waste places, Eight Mile Rock, Great Bahama Isl., Bahamas, February 5–13, 1905 (Field); *W. E. Broadway* 2690, San Juan,

[1] Biologically the var. *radiata* is best typified by such material as is found in Florida and the West Indies, while the var. *minor* is best typified by specimens of the Orient. In the Canary Islands and a few other places these two varieties tend to approach each other or to intergrade. In Mexico and the West Indies var. *radiata* tends at times to approach var. *bimucronata*.

Trinidad, West Indies, May 20, 1908 (Field); *Stewardson Brown* 14, Mandeville, Jamaica, February 15–26, 1910 (Phila.); *idem & N. L. Britton* 125, waste land, Paget, Bermuda, August 31–September 20, 1905 (Field; Kew); *iidem* 179, Hamilton, Bermuda, August 31–September 20, 1905 (Field; Phila.); *Otto Buchtien* 117, alt. 2,450 meters, Cotaña, on the Ilimani River, Bolivia, November, 1911 (Del., 2 sheets; Gray; Kew); *Emile Burdet* 300, Egypt, November 22, 1889 (Del.); *A. B. Burgess* 575, New Smyrna, Florida, March 29–31, 1904 (Berl.); *idem* 639, Cape Canaveral, Florida, April 2–5, 1904 (Berl.); *Dr. & Mrs. P. P. Calvert*, Cartago, Costa Rica, November 30, 1909 (Penn.); *J. R. Churchill*, Port Antonio, Jamaica, March 7–26, 1897 (Field; Gray); *W. N. Clute* 33, Bog Walk, Jamaica, February 4, 1900 (Phila.); *F. S. Collins* 21, roadside, Walsingham, Bermuda, April 28, 1912 (Gray); *idem* 44, roadside near Flatts, Bermuda, May 1, 1912 (Gray); *idem* 301, very common, roadside, Flatts, Bermuda, July 27, 1913 (Berl.; Kew); *idem* 302, roadside, Paget, Bermuda, August 21, 1913 (Berl.; Kew); *Rob. Combs* 432, Cieneguita, Distr. Cienfuegos, Prov. Santa Clara, Cuba, August 8 (fide lectoris ipsius inscript.), 1895 (Berl.; Gray; Kew; Mo.); *Alice C. Cook* 694 pro parte, Tafira, Gran Canaria, Canary Isls., June, 1897 (Carn.; Phila.); *T. Cooper* 2520, Cape of Good Hope, Natal, 1862 (Kew: var. *minori* adpropinquans); *J. P. Couthouy*, Andes, Quito, Ecuador, 1855 (Phila.); *A. H. Curtiss* 658, waste places near Havana, Cuba, February 25, 1905 (Brit.; Cop.; Del.; Field; Kew; Mo.; Mun.); *idem* 1498, Mosquito Lagoon, Florida, June (Berl.; Boiss.; Brit.; Gray; Kew; Kiel; Mun.; Penn.; U.V.); *idem* 5387, cultivated and waste grounds, Palm Beach, Florida, May 13, 1895 (Boiss.; Del.; Kew; U.V.); *W. J. Dowson* 189, Nairobi, British East Africa, September 27, 1915 (Kew); *Eggers* 3379, Jérémie, Haiti, January 18, 1888 (Cop.); *idem* 3982, Fortune Isl., Bahamas, February 11, 1888 (Cop.); *C. Ehrenberg* 440 pro parte, Mineral del Monte, Hidalgo, Mexico, October (Berl.); *idem* 471, Real del Monte (Berl.); *A. Fendler* 695 pro parte, near Tovar, Venezuela, 1854–1855 (Del.; e *Bidente domingensi* O. E. Schz. vix differt); *J. R. Ferrié* 95, Naze, Isl. Amainie-Oshéma, Riu-Kiu (Loo-choo, Liu-kiu, etc.) Isls., March–April, 1897 (Del.); *Nellie F. Flynn* 79, Bermuda, March 16, 1910 (Mo.); *A. Fredholm* 6277, Hillsborough Co., Florida, February 28, 1904 (Gray); *H. Galeotti* 2278, moist fields, Cordillera, State of Vera Cruz, Mexico, October, 1840 (Del.); *G. F. Gaumer*, Izamal, Yucatan, Mexico, in 1888 (Kew); *idem* 129, Cozumel Isl., Quintana Roo, Mexico, June 11, 1885 (Kew; Phila.); *idem* 451 p.p., Izamal, Yucatan, Mexico, 1895

(Gray; Kew; Mo.); *idem* 632, Yucatan (Berl.; Boiss.; Mo.); *idem* 1469, Chichankanab, Yucatan, Mexico (Berl.); *Gay*, Coquimbo, Chile, 1839 (Del.); *Germain*, in fields, Quillota, Chile, 1855–1856 (Del., 2 sheets); *J. M. Greenman* 172, near Córdoba, Vera Cruz, January 25, 1906 (Field); *Josiah Gregg*, Parras, Coahuila, Mexico, May 16, 1847 (Gray); *J. W. Harshberger*, Big Hammock, Miami, Florida, August 12, 1911 (Penn.); *idem*, bay beach, Sanibel Isl., Lake Okeechobee, Florida, June 10, 1912 (Penn.); *idem* 89, Navy Isl., Port Antonio, Jamaica, July 10, 1901 (Phila.); *A. A. Heller* 6428, in sand near the sea at Santurce, Puerto Rico, January 19, 1903 (Field; Del.; Mo.); *idem* et *uxor* 6, Puerto Rico, 1899 (Brit.; Kew); *Aug. Henry* 1111, Ichang, Prov. Hu-peh, China, communic. September, 1886 (Gray; Kew; var. *minori* adpropinquans); *Heyde & Lux* 3404, alt. 1,800 meters, San Miguel Uspantán, Dept. Quiché, Guatemala, May, 1892 (Field); *iidem* 3788, Guatemala, 1892 (Field); *A. S. Hitchcock* 135, Fort Myers, Florida, July–August, 1900 (Gray); *E. W. D. Holway* 29, San Rafael, Dept. Guatemala, Guatemala, January 7, 1915 (Gray; forma valde pilosa); ex *Hort. Soc. Hort. Lond.*, September 6, 1829 (Kew; sub nom. *Bidente striata* Sw.; foliis vere var. *radiatae* non var. *bimucronatae;* radiis immaturis sed certe distinguentibus; facie paulum ei f. *decumbentis* simili); *Jameson*, Ecuador (Mus. V.); *O. E. Jennings* 497, near Caleto Grande, Isle of Pines, West Indies, May 22, 1910 (Carn.); *M. E. Jones*, alt. 1,650 meters, Huachuca Mts., Arizona, September 3, 1903 (N.Y.); ex *herb. O. Kuntzei*, Caquaj, Puerto Rico, March 8, 1874 (N.Y., sub nom. *Bidente pilosa* L. *a. leucantha subsimplicifolia*); *F. C. Lehmann* 3596, cultivated ground at alt. 1,860 meters, Chapa, Cauca, Colombia, February 29, 1884 (Berl.; Boiss.; var. *minori* adpropinquans); *idem* 5664, alt. 1,000–2,000 meters, highlands of Popayán, Colombia (Kew); *E. C. Leonard* 3466, Port au Prince, Haiti, April 1–2, 1920 (Del.); *A. Letourneux* 79, Hagueret-en-Naouatié and at the canal, near Alexandria, Lower Egypt, April 15, 1877 (Berl., 3 sheets; Boiss.; Mus. V.); *C. O. Levine*, Honam Isl., Kwangtung Prov., China, October 13–November 9, 1916 (Calif.; nom. sinense Kam p'un ngan chan); *F. M. Liebmann* 630, Mexico, February 1841 (Cop.); *idem* 631, Mirador, Vera Cruz, Mexico, October–November, 1841 (Cop.); *idem* 650, Jicaltepec, Vera Cruz, April, 1841 (Cop.); *J. J. Linden* 1201, Mirador, Vera Cruz, February, 1839 (Kew); *Lloyd* 1042, Jamaica, January, 1892 (Mo.); *H. Lynes* 601, alt. 1,080 meters, Kubue, Darfur, Sudan, August, 1921 (Kew); *J. F. Macbride* 2899 and 2901, alt. about 2,400 meters, Matucana,

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Peru, March 14–18, 1923 (Field; forma radiis plerumque 5–8 mm. longis et saepius subflavidis); *E. E. Maire*, alt. 2,500 meters, cultivated places, plain of Tong-tchouan, China, September, 1912 (Del., 2 sheets); *Alexander Mathews* 1750, Peru, 1835 (Kew); *C. F. Millspaugh* 144, Cataño, Puerto Rico, January 6–11, 1899 (Field); *idem* 1446 and 1464, Cape Corrientes, Cuba, February 17, 1899 (Field); *idem* 1854, Navy Island, Jamaica, November, 1900 (Field); *idem* 2222, Lake Cunningham, Isl. New Providence, Bahamas, April 8, 1904 (Field); *idem* 2363, South Bimini Isl., Bahamas, April 15, 1904 (Field); *idem* 2419, South Cat Cay, Bahamas, April 16, 1904 (Field); *idem & C. M. Millspaugh* 9087, rocky plain, Jacksonville, Isl. East Caicos, Bahamas, February 26–27, 1911 (Field); *Frederick Müller* 1194, Orizaba region, Vera Cruz, 1853 (Mus. V.); *Max Müller*, Havana, Cuba (Berl.); *G. V. Nash* 653, Eustis, Florida, May 1–15, 1894 (Berl.; Boiss.; Del.; Kew; U.V.); *idem* 1360, eodem loco, July 16–31, 1894 (Phila.); *E. W. Nelson* 1300, alt. 1,500–1,590 meters, Valley of Oaxaca, State of Oaxaca, Mexico, September 20, 1894 (U.S.); *J. I. & A. R. Northrop* 36, Nassau, New Providence, Bahamas, January, 1890 (Boiss.; Kew); *Edward Palmer* 420, Saltillo, Coahuila, Mexico, September, 1898 (Gray); *B. H. Patterson*, Daytona, Florida, November 25, 1917 (Carn.); *F. W. Pennell* 13603, alt. 3,300–3,400 meters, bushy slope of canyon, San Sebastián, Dept. Cuzco, Peru, April 25, 1925 (Field); *A. Penther* 1223, South Africa, October 24, 1894 (Mun.); *E. Pincherle*, in fields, near Tunis, Tunis, January 21, 1895 (Field); *H. Pittier* 6990, alt. 1,500 meters, San Rafael de Cartago, Costa Rica, August 28, 1892 (Gray); *Eduard Poeppig*, Cochero, Dept. Huánuco, Peru, in 1830 (Mus. V.); *C. L. Pollard, G. N. Collins, & E. L. Morris* 59, Sugar Loaf Key, Florida, March 12–14, 1898 (Del.; Field); *C. G. Pringle* 193, valley, Jimulco, Coahuila, Mexico (Boiss.; Del.; Field; Kew; Mus. V.; U.V.; forma var. *minori* et specie ipsi adpropinquans); *Christen Raunkiaer* 1083, San Juan, Puerto Rico, April 3, 1906 (Cop.); *E. M. Reineck*, ditch, City of Telotas, Rio Grande do Sul, Brazil, November, 1903 (Del.); *Rivet* 261, Quito, Ecuador, October, 1902 (Par.); *idem* 614, Ecuador, June, 1904 (Par., var. *bimucronatae* adpropinquans); *Rojas* 273, alt. 650 meters, San Carlos, Dept. Retalhuleu, Guatemala, March 22, 1921 (Mo.); *J. N. Rose* 2636, near Monte Escobedo, Zacatecas, Mexico, August 26, 1897 (U.S.); *idem, Fitch, & Russell* 4237, San Pedro de Macorís, Santo Domingo, March, 1913 (U.S.); *J. N. Rose & J. Painter* 6638, Tequixquiac, Hidalgo, Mexico, August 30, 1903 (U.S.); *iidem & J. S. Rose* 9917, near Tehuacán, Puebla,

August 30–September 8, 1905 (U.S.); *J. T. Rothrock*, Manatee Co., Florida, February 25, 1887 (Penn.); *idem* 297, Fortune Isl., Bahamas, November 27, 1890 (Phila.); *Ryan*, Montserrat, West Indies (Cop.); *R. de la Sagra* 22, Cuba, 1836 (Del.); *Sallé*, Orizaba region, Vera Cruz, Mexico (Del.); *idem* 136, 137, and 151, Orizaba, Vera Cruz, 1854–1855 (Del.); *A. Saulière* 26, Kodai-kanal Station, Pulney Hills, Madura District, Presidency of Madras, India, 1914 (Del.); *idem* 156, alt. 1,800 meters, Shembaganur, Madura District, Presidency of Madras, September 6, 1913 (Kew); *C. J. W. Schiede* 344, in thickets near Jalapa (Xalapa), Vera Cruz, Mexico, about 1829 (Berl.); *Schindler* 430, alt. 250 meters, Feng-shih in the valley of the Han River, Distr. of Yung-ting, southwest Fukien (Fu-kien), China, January, 1909 (Del.; Mus. V.); *R. H. Schomburgk* 121, Isl. Santo Domingo (Kew); *Schott* 118, Havana, Cuba, November 3, 1864 (Brit.); *idem* 533, Mérida, Yucatan, Mexico, July 26, 1865 (Brit.); *Joseph Schrenk*, on ballast, Jersey City, New Jersey, October, 1879 (N.Y.); *Eduard & Caecilie Seler* 175, near Tancanhuitz, San Luis Potosí, Mexico, February, 1888 (Berl.); *J. A. Shafer*, Pinar del Río, Prov. Pinar del Río, Cuba, April 25, 1903 (Carn.); *idem* 30, Madruga, Prov. Havana, Cuba, April 1, 1903 (Carn.); *P. Sintenis* 1148, along roads, Bayamón, Puerto Rico, March 23, 1885 (Boiss.; Kew; Mun.); *idem* 5173, on grassy slopes at Guayabala, Puerto Rico, September 26, 1886 (Mus. V.; Phila.); *idem* 6779, Manatí, Puerto Rico, April, 1887 (Carn.); *Edith Skene* 139, very common, Kavirondo, British East Africa, 1907–1908 (Del.); *C. L. Smith* 1501 and 1521, San Francisco (near Vera Cruz), Vera Cruz, Mexico, May, 1894 (Gray); *H. H. Smith*, Santa Marta, Colombia, 1898–1901 (Phila.); *idem* 2668, eodem loco et tempore (Del.; Mo.); *U. C. Smith*, Georgiana, Florida, January 24, 1891 (Phila.); *R. Spruce* 4610, near Tarapoto, Dept. San Martín, Peru, 1855–1856 (Mus. V.); *R. J. Stordy* 23, alt. 4,200 meters, Hacienda Altosaica, Dept. Junín, Peru (Kew); *E. Taquet* 2991, in hedges, Isl. Quelpaert, Corea, November, 1909 (Del.); *Norman Taylor* 133, Sevilla Estate, Guama River Basin, near Santiago, Cuba, August 31, 1906 (Phila.); *idem* 500, alt., 1,020 meters, Jiquarito Mt., Sierra Maestra, Sevilla Estate, near Santiago, Cuba, September 18, 1906 (N.Y.); *Dr. & Mrs. W. R. Taylor*, Fort Cristóbal, Puerto Rico, October, 1916 (Penn.); *A. J. Teague* 149, Odzani River Valley, Distr. Manica, Div. Umtali, Southern Rhodesia, 1914 (Kew); *S. M. Tracy* 6456, Sneed's Isl., Florida, September 9, 1899 (Gray); *idem* 6921, Longboat Key, Florida, April 27, 1900 (Del.; Mus. V.); *Tracy & Lloyd* 495, Port Eads, Louisiana, August

BIDENS MICROPHYLLA Sherff

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21, 1900 (Brit.; Del.; Gray; Mus. V.); *H. von Tuerckheim* 762, alt. 1,290 meters, Cobán, Dept. Alta Verapaz, Guatemala, May, 1886 (Berl.; Gray); *E. Ule* 6557, pampas at Tarapoto, Dept. San Martín, Peru, November, 1902 (Berl.; Del., 2 sheets); *H. A. Van Hermann* 379, Santiago de las Vegas, Prov. Havana, Cuba, where "sometimes used as a forage," Dec. 19, 1904 (Field); *A. E. Wight* 3, Crantstown Village, Nassau, New Providence, Bahamas (Berl.; Field); *Wilson* 498, vicinity of Santiago de las Vegas, Prov. Havana, Cuba, August, 1904 (Field); *N. P. Woodward*, wool waste, North Worcester, Massachusetts, October 15, 1917 (Gray); *Young* 154, alt. 900–1,350 meters, Vom, Bauchi Plateau, northern Nigeria, 1922 (Kew); *Charles Wright* 317 pro parte, eastern Cuba. 1856–1857 (Del.; Gray; Kew; Mo.).

Linnaeus, in giving the habitat of his *Coreopsis leucanthema*, said, "Hab. in Amer. Miller." In the *Coreopsis* cover in the Linnean Herbarium is still to be found Linnaeus' specimen. It is somewhat immature but has one head with whitish rays. These are less well developed than those usually found, but much more conspicuous than those on the radiate or subradiate var. *minor*. The sheet is labeled "Leucanthema radio albo." The spelling *"leucanthema"* is seen to agree with that found originally in the *Amoenitates Academicae* and not that later published (*leucantha*) in the second edition of the *Species Plantarum*. Linnaeus cited two synonyms, the first (Bidens americana trifolia, leucanthemi flore. Tournefort. inst. 462) being apparently that from which he derived the name *leucanthema*. In his *Systema Naturae* ed. 10. 2: 1228, published in 1759, he again used the name *leucanthema*. Although the name *leucantha* was adopted later by Willdenow (loc. cit.) and has been accepted widely since then, the original spelling *leucanthema* was restored by Krause (loc. cit.).

When we trace the above Linnean citation of Tournefort's *Institutiones*, we find that Tournefort gave merely two lines for the plant later cited by Linnaeus: "Bidens trifolia, Americana, Leucanthemi flore. *Chrysanthemum Americanum, Ciceris folio glabro, Bellidis majoris flore Prodr. Par. Bat.*" Thus it is seen that Linnaeus' first cited synonym goes back directly to the plant listed in Hermann's *Paradisi Batavi Prodromus*. However, this cited plant is the same as that listed in the somewhat later (posthumous) *Paradisus Batavus* (edited by William Sherard), which was cited by Linnaeus for his *Coreopsis alba*.[1]

[1] Linnaeus' description of *C. alba*, the second citation, and the habitat all refer to Herm. Par. Bat. 124, *pl. 124*. His first citation, however, is to an entirely different plant (Coreopsis scandens, foliis serratis ternato-pinnatis, receptaculo

On studying the original *Coreopsis leucanthema* description and habitat data ("Caulis trium vel quatuor pedum, ... Foliolis quinque, rarius tribus, ovatis . . . . Habitat in America. Miller . . . " Amoen. Acad. 4: 291. 1759), we see that Linnaeus did not really have in mind the plant of *Hermann's*, but rather a plant received from Philip Miller and perhaps the same specimen that is left to-day in the Linnean Herbarium.[1] Later, Linnaeus very clearly showed his belief that the two plants were different specifically, naming the Hermann plant *Coreopsis alba*. DeCandolle (loc. cit.) accepted this treatment, transferring *Coreopsis alba* to *Bidens* to accord with the position of *Bidens leucantha* (L.) Willd. A few years ago I dealt with these last two names (Bot. Gaz. 64: 32. 1917), stating that it "seems much the safer course to retain the two names separately for the present rather than merge them as done by O. E. Schulz." Since that time I have examined several hundreds of additional specimens and recently have concluded that *B. leucantha* and *B. alba* are related to each other as variety and forma (becoming respectively, as will be seen in the following text, var. *radiata* and var. *radiata* f. *Dondiaefolia*).[2]

Willdenow compared his *B. leucantha* with *B. biternata* (Lour.) Merr. & Sherff, *B. pilosa* L., and *B. pilosa* var. *minor* (Bl.) Sherff for several years under cultivation and decided it to be distinct: "Jam per plures annos cum binis sequentibus[3] culta faciem servavit" (Sp. Pl. 3: 1719. 1804). Since Willdenow's time its status has been the subject of much difference of opinion. Asa Gray, who gave considerable attention to this matter, wrote (Proc. Amer. Acad.

nudo. Brown. jam. 321) and must be excluded, as it conflicts with the Linnean description (cf. DC. Prodr. 5: 605. 1836.—"Syn. Brownei à Linnaeo citatum videtur alienum ex recept. nudo dicto"). The Browne plant, if a *Bidens*, was one of the tall, yellow-flowered climbers found in Jamaica, not the lower, white-flowered species that Linnaeus had in mind.

[1] The fact that the sheet bears, as already stated, the original spelling *"leucanthema"* rather than the later spelling *"leucantha"* may be taken as evidence that the plant is the original Miller specimen.

[2] In a former article (Bot. Gaz. 64: 32. 1917), I stated the reasons for believing that *Bidens Dondiaefolia* Less. was synonymous with *Coreopsis alba* L. Subsequently I have found Lessing's type (Hlle.). It matches exactly (cf. Sherff, Bot. Gaz. 81: 44. 1926) the *Müller* specimen (No. 148; N.Y.) formerly cited by me, thus confirming the earlier treatment. For detailed presentation, see under var. γ. *radiata* f. 2. *Dondiaefolia*.

[3] Viz., *B. biternata* (*B. chinensis*) and *B. pilosa*. But Willdenow's herbarium material of *B. biternata* (Willd. No. 15023) consists of 4 sheets, nos. 1, 2, 3, and 4. Nos. 1–3 are *B. pilosa* L. var. *minor* and only No. 4 bears true *B. biternata* (cf. O. E. Schulz, in Urb. Symb. Antill. 7: 135. 1911; cf. G. Walpers—Nov. Act. Nat. Cur. 19, Suppl. 1: 271. 1843—who erroneously interpreted Willdenow's herb. No. 15023 as being identical with his—i.e., Willdenow's—herb. No. 15022, *B. pilosa* var. *radiata*, i.e., *B. leucantha* Willd.).

BIDENS TRIPLINERVIA H.B.K. (figs. *j*, *k*); var. MACRANTHA (Wedd.) Sherff (figs. *a–i*, *l–v*)

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19: 16. 1884): "*B. leucantha* Willd. This, the *Coreopsis leucanthema* L. Amoen. Acad., *C. leucantha* L. Sp. ed. 2,–1282 (Desc. Fl. Ant. t. 583), and the *C. coronata* L. as to *Plumier's* plant, I take to be quite distinct from the radiate form of *B. pilosa*." But O. E. Schulz, whose writings display a profound and comprehensive knowledge of a number of the species of *Bidens*, treats *B. alba*, by which he means *B. leucantha* Willd., as merely a variety of *B. pilosa* ("Einige Autoren wollen auch jetzt noch die Abart als selbständige Art betrachten. Dieser Ansicht kann ich aber nicht beipflichten, weil ich oft direkte Ubergangsformen gesehen habe."—Bot. Jahrb. 50, Suppl. 176. 1914). In 1913, Dr. N. L. Britton, who had had considerable field experience with these forms, told me that *B. leucantha* and *B. pilosa* seemed to him unquestionably distinct species, not only in leaf and ray but in the appression of the involucral bracts at anthesis. In 1916, however, he stated to me that as a result of further field observations he had decided to equate the two in one species. Notwithstanding the opinion held by Schulz, Britton, and many others, I have until recently maintained the two as separate species. A study of the large assemblage of specimens in Berlin has revealed, however, several "direkte Ubergangsformen" that efface quite effectually the specific limits and compel the adoption of a varietal rank for the radiate form. Schultz Bipontinus' name *B. pilosa* var. *radiata* is apparently the earliest pertaining to varietal rank.

B. striata Sweet (loc. cit.; etiam Curtis' Bot. Mag. 59: *pl. 3155.* 1832) is a form with large, particularly roseate rays.[1]

The pre-Linnean *Bidens trifolia* Feuill. (not listed above) is cited by some authors (e.g., Gay, Hist. Chil. 4: 293. 1849; Reiche, Fl. Chil. 4: 103. 1905) as a synonym for *B. pilosa* var *alausensis* (H.B.K.) Sherff. The leaves in Feuilles' illustration (Journ. Observ. 3: 10, *pl. 4.* 1725), however, match better those of *B. pilosa* var. *radiata.*[2]

Under the name *B. leucantha* the *Materia Medica Mexicana* (2: 153–172. 1898) gives a comprehensive treatment from the standpoints of history, medicine, botany, etc. The treatment there doubtless applies to the vars. *radiata* and *bimucronata*, each in part.

Bidens pilosa var. **γ. radiata** f. 1. **indivisa** Sherff, Bot. Gaz. 88: 297. 1929.

A varietate ipsa foliis indivisis ovato-lanceolatisque differt.

[1] A cultivated specimen given by Lindley in 1830 and formerly in Kunth's herbarium is at Berlin (Berl.). It displays an approach to var. *bimucronata* (Turcz.) O. E. Schulz.

[2] Feuilles stated that he found his plant at 37° S. Lat., which is farther south in Chile than known for other specimens of var. *radiata* studied as yet by me.

Type specimen: Collected by *J. S. De La Cruz*, No. 1792, growing 3 feet high, Upper Rupununi River, near Dadanawa, Lat. 2° 45′ N., British Guiana, July 24–29, 1922 (Field).

Distribution: British Guiana, West Indies, etc.

Specimens examined: *Alexander*, Jamaica (Gray); *De La Cruz* 1792 (type, Field); *idem* 2284, growing 2 ft. high, Upper Mazaruni River, Long. about 60° 10′ W., British Guiana, September 22–October 6, 1922 (Field).

In his *Flora of The British West Indian Islands* (p. 373. 1861), Grisebach stated that "a remarkable form, with all the leaves simple, hispidulous achenia, and whitish-pubescent involucres, was collected by Dr. Alexander, but transitions into the common *B. leucanthus* [i.e., *B. pilosa* var. *radiata* Schz. Bip.] occur among Mr. March's specimens." A former study of Alexander's materials left me unconvinced as to the value of their simple-leaved character for drawing taxonomic distinctions. The recently collected specimens by De La Cruz were obtained at different localities and about two months apart, yet both reveal in all respects a striking similarity. The leaves all are simple, thin, glabrous, the blades ovate-lanceolate, serrate, acute or subacuminate at apex, the larger ones about 3.5–4 cm. long and 1.5–2 cm. wide, the petioles slender and 1–2 cm. long. Compared with chance, more or less simple-leaved plants of *B. pilosa* proper that are sometimes found (*B. pilosa discodea* Schz. Bip. em. 1. *subsimplicifolia* O. Ktze. Rev. Gen. 1: 322. 1891; "folia omnia vel plurima integra (cfr. Gris. Fl. Westindien)"—Ktze. loc. cit.), also of *B. pilosa* var. *radiata* proper (*B. pilosa* var. *leucantha* f. *subsimplicifolia* O. Ktze. Rev. Gen. 1: 322. 1891), these plants appear to represent a more pronounced and less ephemeral form.

Bidens pilosa var. γ. **radiata** f. 2. **Dondiaefolia** (Less.) Sherff, Bot. Gaz. 97: 607. 1936.

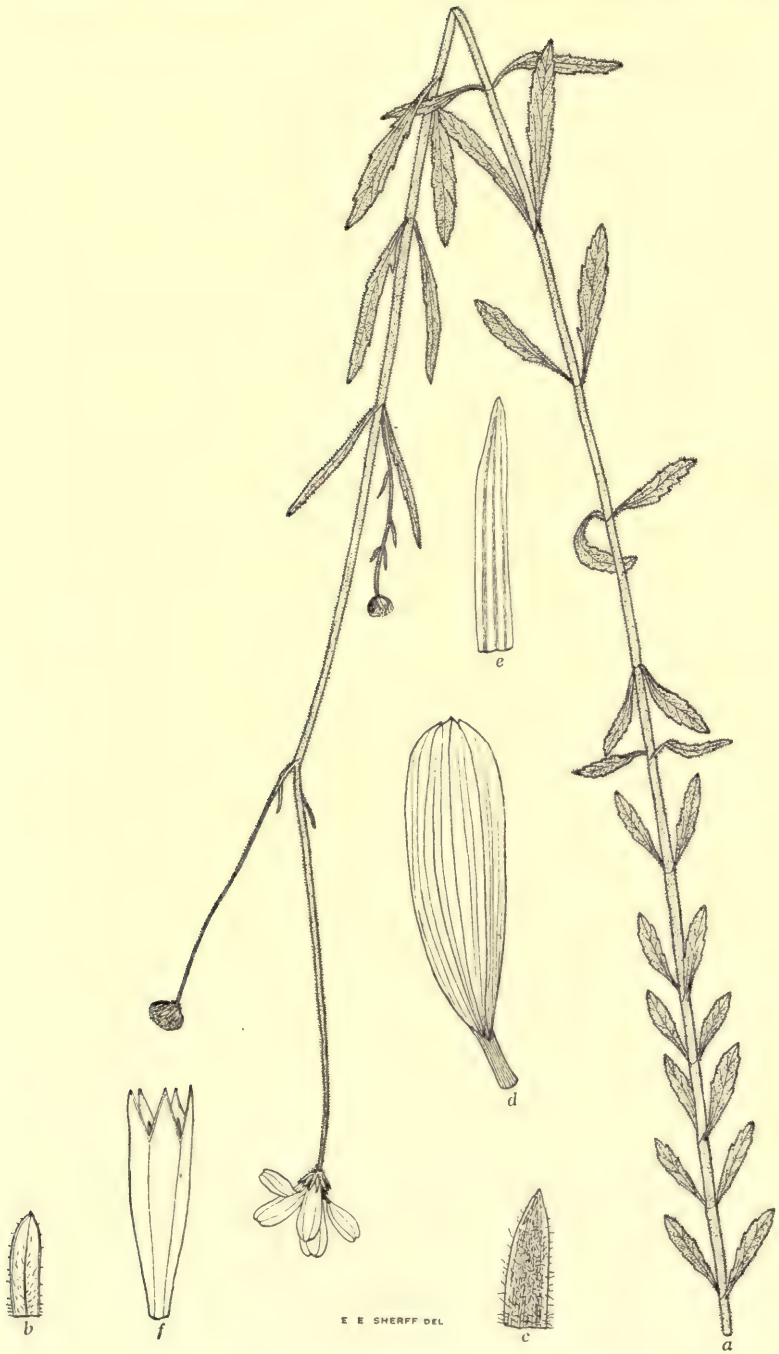
Coreopsis alba L. Sp. Pl. ed. 1. 2: 908. 1753; ed. 2. 2: 1282. 1763 (exclud. syn. Brown).

Bidens Dondiaefolia Less. Linnaea 5: 155. 1830.

Bidens alba (L.) DC. Prodr. 5: 605. 1836.

Bidens pilosa var. *alba* (L.) O. E. Schz., Urb. Symb. Antill. 7: 136. 1911.

Humilis, plerumque glabrata; caulibus vel ramis inferioribus demissis ad nodos saepe radicantibus, basim versus ramulis saepe sterilibus foliosisque instructis; foliis parvis (±2.5 cm. longis), saepius 3-partitis foliolis saepius rhomboideo-ovatis. Capitula longe et saepius erecte pedunculata, ligulis siccis flavido-albis.



BIDENS TRIPLINERVIA var. HIRTELLA (H.B.K.) Sherff

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Type specimen: Collected by *Christian J. W. Schiede* and *Ferdinand Deppe*, near Vera Cruz, State of Vera Cruz, Mexico, about 1828 (Hll.).

Distribution: Central part of State of Vera Cruz (especially at and near the coast), Mexico.

Specimens examined: *J. M. Greenman* 6, near the wharf, City of Vera Cruz, January 22, 1906 (Field); *idem* 23, La Laguna, near City of Vera Cruz, eodem temp. (Field); *idem* 97, along the shore, north of City of Vera Cruz, January 24, 1906 (Field); *Frederick Müller* 148, Vera Cruz, August, 1853 (N.Y.); *idem* 4067, Orizaba (N.Y.); *C. R. Orcutt* 2666, Vera Cruz, February 16, 1910 (Field; Kew; U.S.); *idem* 2991, Sanborn, Vera Cruz, April 18, 1910 (Field); *Schiede & Deppe*, near City of Vera Cruz, about 1828 (type, Hll.); *Heinrich Wawra* 206, Soledad and vicinity (Mus. V.).

Bidens pilosa var. γ. **radiata** f. 3. **decumbens** (Greenm.) Sherff, Bot. Gaz. 97: 607. 1936.

Bidens decumbens Greenm. Proc. Amer. Acad. 34: 576. 1899.

Caules robustiores, decumbentes, purpurascentes, 1.5–3 m. longi; internodiis glabris. Foliorum segmenta lateralia obovata terminale saepe rhomboideo-ovatum. Ligulae ±2 cm. longa.

Type specimen: Collected by *Cyrus Guernsey Pringle*, No. 6820, sand dunes, Tampico, State of Tamaulipas, Mexico, April 29, 1898 (Gray).

Distribution: Known only from type locality in southeasternmost Tamaulipas, Mexico.

Specimens examined: *Pringle* 6820 (type, Gray: cotypes, Berl.; Boiss.; Brit.; Carn.; Del.; Field; Kew; Mo.; Mun.; Par.; Phila.; Mus. V.; U.V., etc.).

Referred in the past by me to var. *radiata* proper, but probably best treated as a distinct forma because of its unique growth habit.

Bidens pilosa var. δ. **bimucronata** (Turcz.) O. E. Schulz in Urban, Symb. Antill. 7: 138. 1911. Pl. CIV, figs. *a–i*.

Bidens caracasana DC. Prodr. 5: 600. 1836.

Bidens bimucronata Turcz. Bull. Soc. Nat. Mosc. 24: 184. 1851; Walp. Ann. Bot. Syst. 5: 224. 1858.

Acocotli quauhuahuacensis Hernández ex Mat. Med. Mex. 2: 154. 1898 (pro parte; cf. var. *radiatam*).

Caules et folia plerumque plus minusve glaucoideo- vel pallido-viridia. Capitula plerumque radiata radiis candidis vel subrosaceis,

pansa ad anthesin 1–2.3 cm. lata. Achaenia saepius 6–10 mm. longa, gracilia, circ. 0.75 mm. lata, pilis erecto-patentibus disperse hirsuta, aristis omnino deficientibus exaristata vel aristis 1–2 (rariter –4) plerumque tantum 0.5–1 mm. longis munita.

Type specimen: Collected by *Benedict Jaeger*, No. 146, on the Island of Santo Domingo (Petrop.).

Distribution: In Mexico from states of San Luis Potosí, Coahuila, Chihuahua, and Sinaloa southeastward to states of Chiapas and Yucatan, also, but rarely, on certain of the West Indies (Jamaica, Santo Domingo, Trinidad) and in northern Venezuela; found in 1879 (*Martindale, Parker*) on ballast at Philadelphia, Pennsylvania.

Specimens examined: *Alwin Aschenborn*, Mexico, 1872 (Berl.); *idem* 72, Mexico (Berl.); *J. L. Berlandier* 756, Chapultepec, State of Mexico, 1827 (Brit.; Del.; Par., 2 sheets); *idem* 1138 pro parte, Toluca, State of Mexico, October, 1827 (Kiel; Mus. V., 2 sheets; Webb; type material of *Bidens Caucalidea* DC. and *Bidens Daucifolia* DC.; formae *odoratae* adpropinquans et in herb. DC. Prodr. in Del. illae formae propior); *E. Bourgeau* 148 pro parte, fields and borders of ditches near City of Mexico, State of Mexico, May 23, 1865 (Del.; Petrop.); *idem* 188, fields, eodem loco et tempore (Kew); *idem* 811, borders of the roads to Los Baños, State of Mexico, August 14, 1865 (Berl.; Boiss., 2 sheets; Cop.; Del.; Kew, 2 sheets; Mun.); *C. Conzatti & V. González* 996, alt. 1,750 meters, State of Oaxaca, Mexico, July–August, 1900 (Berl.); *A. Dugès*, in garden near Guanajuato, State of Guanajuato, 1891 (Gray); *C. Ehrenberg*, Haiti (Berl.); *idem* 440 pro parte, Regla, Hidalgo, Mexico (Berl.); *idem* 442 pro parte, Mexico, October (Berl., cum forma *odorata* lecta); *H. Galeotti* 2370, near Real del Monte, Hidalgo, Mexico, 1840 (Del.); *G. F. Gaumer* 451 p.p., Izamal, Yucatan, Mexico (Berl.; Gray; Kew; N.Y., 2 sheets); *August Ghiesbreght* 556, Chiapas, etc., southern Mexico, flowering from July to November, 1864–1870 (Gray; Mo.); *Josiah Gregg* 236 pro parte, State of Puebla, Mexico, July 13, 1848 (Mo., cum f. *odorata* commixt.); *idem* 236*b* pro parte (Kew, cum f. *odorata* commixt.); *C. V. Hartman* 564 pro parte, State of Chihuahua, Mexico, Sept. 8, 1892 (Gray, cum f. *odorata* lecta);[1] *Hooker*, Jamaica, 1843 (Kew); *Theodor Hartweg* 1608 p.p., "California" (? Brit.);[2] *Hort. Berol.*, cult. anno 1831, e seminibus mexi-

[1] "As young eaten with pinole [Mexican cereal meal] and salt, boiled" (fide Hartmanii).

[2] "California" perhaps erroneous. Cf. Hemsl. Biol. Centr. Amer. Bot. 4: 127. 1886: "owing to their having been incorrectly localized in the Hookerian herbarium."

BIDENS TRIPLINERVIA var. MACRANTHA (Wedd.) Sherff (figs. *j–p*); var. MOLLIS (Poepp. & Endlich.) Sherff (figs. *a–i*)

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canis a Deppeo missis (Berl., 3 sheets, sub nominibus *Bidente retusa* Link et *Coreopside retusa* Link); *Jaeger* 146 (type, Petrop.); *J. G. Lemmon* 2766, near Fort Huachuca, Arizona, 1882 (Gray, formae *odoratae* paulum adpropinquans; *idem* 2767, eodem loco, 1883 (Gray, 2 sheets; formae *odoratae* paulo adpropinquans); *F. M. Liebmann* 649, Chinantla, Puebla, Mexico, May, 1841 (Cop., forma); *idem* 655, Tehuacán, Puebla, December, 1841 (Cop., sub nom. *Bidente tehuacana* Klatt); *I. C. Martindale*, on ballast, Philadelphia, Pennsylvania, September, 1879 (Phila., 2 sheets); *E. W. Nelson* 3492, alt. 1,740–1,950 meters, Valley of Comitán, Chiapas, Mexico, December 8, 1895 (U.S.); *C. R. Orcutt*, Mexico, 1910–1911 (Kew); *idem* 3656, Olivar, Federal Distr., Mexico, August 17, 1910 (Mo.); *idem* 4335, Santa Fe, Morelos, Mexico, August 25, 1910 (Mo.); *Edward Palmer* 3, Durango and vicinity, State of Durango, Mexico, April–November, 1896 (Berl.; Brit.; Mo.); *idem* 263, shady places in gardens and old fields, eodem loco, June, 1896 (Gray); *idem* 282, southwestern Chihuahua, Mexico, August–November, 1885 (Gray); *idem* 673 pro parte, Durango and vicinity, Mexico, April–November, 1896 (Gray; Kew); *idem* 676, eodem loco (Berl.); *C. F. Parker*, on ballast, Philadelphia, Pennsylvania, September 20, 1879 (Phila.); *Parry & Palmer* 484 pro parte, Mexico, 1878 (Mo.; U.S.); *C. G. Pringle* 9859, alt. 2,040 meters, waste places, Tula, Hidalgo, Mexico, September 20, 1902 (Berl.; Carn.; Field; Kew; N.Y.; U.S.); *C. A. Purpus*, Sierra de Parras, Coahuila, Mexico, March, 1905 (Calif.); *idem* 1544 p. p. (pro partibus f. *odorata* et *B. Ostruthioides*), fields, southern Mexico, November, 1905 (Calif.; Gray; Mo.; U.V., etc.; forma achaeniis nonnullarum plantarum exaristatis, aliarum aristatis); *idem* 1905, eodem loco, November, 1906 (Berl.); *Rose & Hay* 5828, near Tehuacán, Puebla, Mexico, August 1–2, 1901 (U.S.); *Rose & Painter* 7781, near Aguascalientes, State of Aguascalientes, Mexico, October 10, 1903 (U.S.); *Rose, Standley, & Russell* 13405, San Blas, Sinaloa, Mexico, March 24, 1910 (N.Y.); *iidem* 13584, along the river, Fuerte, Sinaloa, Mexico, March 27, 1910 (N.Y.); *Baron de Schack*, Trinidad, West Indies (Kew); *J. G. Schaffner*, on mountains and in cultivated places, Mexico, 1880 (Gray; nom. vernac. aceitillo; planta usitatissima fide Schaffneri); *idem* 206, State of San Luis Potosí, Mexico, October, 1879 (Berl.; Boiss.; Gray; Kiel; Mun.); *idem* (similiter) 206, in sandy places about City of San Luis Potosí, September, 1876 (Berl.; Gray); *idem* 239, Valley of Mexico, State of Mexico (Par., 2 sheets); *Alb. Schmitz* 80 p. p., eodem loco (Mus. V., 3 sheets); *idem* 81, eodem loco (Mus. V., 3 sheets); *idem* 251, Mexico

(Berl.; Brit.; Mus. V.); *idem* 542, fields, Mexico (Brit.; Mus. V.; f. *odoratae* adpropinquans); *idem* 629, Mexico (Berl.); *Walther Schumann* 10 pro parte, Mexico, August 20, 1884 (Berl., cum f. *odorata;* Brit.; Mun.; Mus. V.; U.V.); *idem* 12, Mexico, September 20, 1884 (U.S.); *Eduard & Caecilie Seler* 308, near Axayapictla, Distr. Morelos, Morelos, Mexico, December 17, 1887 (Berl.); *iidem* 572 et 579, near Chihuahua, State of Chihuahua, Mexico, November, 1887 (Berl.); *iidem* 1142, Obregón, Guanajuato, Mexico, October 13, 1895 (Kew; N.Y.); *Uhde* 616 and 623, Mexico (Berl.); *W. J. Vargas* 210, about Caracas, Venezuela, 1830 (Del., type of *Bidens caracasana* DC.).

The name *Bidens caracasana* DC. has been carelessly treated by botanists, having been referred to a number of widely different species. The DeCandolle Prodromus Herbarium (Del.) contains two sheets of type material, *Vargas* 210, Caracas, Venezuela, in 1830. All of this material is the form represented by the type of *B. bimucronata* Turcz., reduced by O. E. Schulz (loc. cit.) to a variety of *B. pilosa* L.

Bidens pilosa var. *δ.* **bimucronata** f. 1. **odorata** (Cav.) Sherff, Bot. Gaz. 81: 41. 1926. Pl. CV and Pl. CVI, figs. *a–h.*

Bidens odorata Cav. Icon. 1: 9 and *pl. 13.* 1791.

Coreopsis Ferulaefolia var. *odoratissima* (Cav. ex Pers.) Pers. Syn. Pl. 2: 477. 1807.

Coreopsis odoratissima Cav. ex Pers. loc. cit.

Coreopsis odorata (Cav.) Poir. in Lam. & Poir. Encycl. Suppl. 2: 350. 1811; Atlas *pl. 704, fig. 1.*

Cosmos tenellus H.B.K. Nov. Gen. et Sp. 4: 188 (240). 1820.

Coreopsis multifida DC. Prodr. 5: 573. 1836.

Coreopsis multifida var. *mutica* DC. loc. cit.

Bidens Daucifolia DC. op. cit. 601.

Bidens Ferulaefolia var. *odoratissima* (Cav. ex Pers.) DC. op. cit. 603.

Bidens Caucalidea DC. op. cit. 604.

Bidens Bonplandii Schz. Bip. in Seem. Bot. Voy. Herald 308. 1852–1857.

Bidens inermis Wats. Proc. Amer. Acad. 23: 278. 1888.

Bidens Deamii Sherff, Bot. Gaz. 56: 490. 1913.

Bidens ramosissima Sherff, op. cit. 491.

Bidens barrancae Jones, Extracts Contr. West. Bot. 18: 82. 1933 (vix typica).

Folia plus dissecta, plerumque bi- vel rarius tripinnata, segmentis angustioribus.

BIDENS SERRULATA (Poir.) Desf.

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Type specimen: Observed in flowering condition in the Royal Garden of Madrid, November 24 (anno non dicto), growing from material obtained originally near the City of Mexico.[1]

Distribution: In Mexico from southern Chihuahua southeastward along the interior region to the State of Oaxaca; very rare in Guatemala, where giving way to var. *calcicola* and its f. *dissecta*.

Specimens examined: *Bro. Adole* 63 (*Arsène distrib.* No. 6350) pro parte, alt. 1,600 meters, Saltillo, Coahuila, Mexico, 1911 (Mo.; U.S.); *Bro. Agniel* (*Arsène distrib.* No. 10430), Querétaro, Mexico, 1910–1913 (U.S.); *anon.* (Del., type of *Coreopsis multifida* DC.); *Bro. G. Arsène*, alt. 2,150 meters, near Hacienda Santa Bárbara, Barranca de la Alseseca, Puebla, State of Puebla, Mexico, 1907 (U.S.; cum var. lecta et commixt.); *idem*, azotea de San Pedro near Puebla, September 27, 1908 (U.S.); *idem* 497, alt. 2,175 meters, azotea del Colegio de San Pedro y San Pablo, Puebla, August 25, 1906 (U.S.); *idem* 497*a*, garden, Puebla, August 30, 1906 (U.S.); *idem* 497*b*, alt. 2,173 meters, College of San Pedro and San Pablo, Puebla, September 23, 1906 (U.S.); *idem* 497*c*, alt. 2,173 meters, azotea del Colegio de San Pedro y San Pablo, September 13, 1906 (U.S.); *idem* 1813, alt. 2,155 meters, Molino de Huexotitla, Puebla, October 20, 1907 (Gray; U.S.); *idem* 2340, alt. 2,170 meters, azotea del Colegio de San Pedro y San Pablo, Puebla, September 27, 1907 (U.S.); *J. L. Berlandier* 1138 pro parte, Valley of Toluca, State of Mexico, September, 1827 (Berl.; Del.; Gray; Hll.; Mus. V.; Par., type material of *Bidens Caucalidea* DC. and *B. Daucifolia* DC.; cum var. ipsa lecta); *E. Bourgeau* 148 pro parte, edges of ditches, Valley of Mexico, State of Mexico, May 23, 1865 (Par.; forma magna et pro parte var. ipsi adpropinquans); *idem* 812 pro parte, Guadalupe, State of Mexico, August 14–24, 1865 (Boiss.; Kew; Par., 3 sheets sub nom. *Bidente montana;* Petrop.; plantae nunc var. *bimucronata* ipsa nunc *f. odorata* nunc plus minusve intermedia); *idem* 813 pro parte, upon terraces about homes, Mexico, State of Mexico, August 30, 1865 (Berl.; Boiss.; Cop.; Del., 2 sheets; Gray; Kew; Par., 4 sheets sub nom. *Bidente maculata;* U.S.; hic illic cum *B. bipinnata* commixt.); ex *herb. Cavanillesii* (Brit., 3 sheets, sub nominibus *Coreopside odorata*, *C. odoratissima* et *Cosmide odorato*); *Thomas Coulter* 380, Zimapán, Hidalgo, Mexico (Kew); *C. C. Deam*, Cholula, Puebla, Mexico, January 1, 1899 (Field; type of *Bidens Deamii*

[1] Material (three specimens) from Cavanilles' herbarium is in the Herbarium of the British Museum of Natural History. Precisely identical material, from Pavón's herbarium, is in the Boissier Herbarium and may safely be regarded as coming from Cavanilles' original plants.

Sherff); *A. Dugès* 471, State of Guanajuato, Mexico, 1891 (Gray); *C. Ehrenberg* 441, Mexico (Berl.); *idem* 442 pro parte, Regla, Hidalgo, Mexico (Kew, cum var. ipsa lecta); *Josiah Gregg* 39, valley near Saltillo, Coahuila, May 7, 1848 (Mo.); *idem* 236 pro parte, State of Puebla, Mexico (Mo., cum var. ipsa lecta); *idem* 236*b* pro parte (Kew, cum var. ipsa lecta); *C. V. Hartman* 564 pro parte, State of Chihuahua, Mexico, September 8, 1892 (Gray; cum var. *bimucronata* ipsa lecta); *Theodor Hartweg* 1608 p.p., fields, State of Guanajuato, Mexico (Kew); *Hort. Par.* e seminibus (fide DC.) in Peruvia[?] lectis et olim ad Hort. Par. a Dombeyo missis (Del., type of *Coreopsis multifida* var. *mutica* DC.); *M. E. Jones* 27757, La Barranca, Guadalajara, Jalisco, Mexico, November 23, 1930 (Pom.; type of *Bidens barrancae* Jones; vix typica); *F. M. Liebmann* 620, State of Oaxaca, Mexico, May, 1842 (Cop.); *idem* 648, Ejutla, Oaxaca, October, 1841 (Cop., 3 sheets); *L. H. MacDaniels* 49, alt. 2,220 meters, Pyramid of Cuicuilco, Tlalpam, Federal Distr., Mexico, August 15, 1935 (Field); *C. R. Orcutt* 3657, El Olivar, State of Mexico, August 18, 1910 (Kew; Mo.); *Edward Palmer* 283, southwestern Chihuahua, Mexico, August–November, 1885 (Gray); *idem* 673 pro parte, Durango and vicinity, State of Durango, Mexico, April–November, 1896 (Gray); *idem* 674, Durango and vicinity, April–November, 1896 (Berl.; Boiss.; Brit.; Field; Kew; Mo., 2 sheets; U.S., ubi etiam aliud specimen est e huius seminibus cultum et Mart. 1, anno 1898 lectum); *idem* 685 et 686, eodem loco et tempore (U.S.); *Parry & Palmer* 484 pro parte, alt. 1,800–2,400 meters, Mexico, 1878 (Kew; Mo.); ex *herb. Pavonii* (Boiss.); *C. G. Pringle*, valley near Tula, Hidalgo, Mexico, September 16, 1899 (Berl.); *idem* 1290, base of the Sierra Madre, Chihuahua, Mexico, September 14, 1887 (Boiss.; Field; Phila.); *idem* 1291, thin soil of ledges, Arroyo Ancho, Sierra Madre, Chihuahua, October 14, 1887 (Berl.; Boiss.; Calif.; Field; Gray; Kew; Phila.; type material of *Bidens inermis* Wats.); *idem* 1638, base of Sierra Madre, Chihuahua, October 2, 1888 (Berl.; Brit.; Calif.; Del.; Field; Mo.; Mus. V.; U.V.); *idem* 5999, hillsides near Cuernavaca, Morelos, Mexico, November 14, 1895 (Cop.; Gray; Mun.); *idem* 7904, near Cuernavaca, September 30, 1899 (Gray); *idem* 13032, under cliffs near Acámbaro, Guanajuato, Mexico, October 6, 1904 (Berl.; Gray; Kew; U.S.); *C. A. Purpus*, Sierra de Parras, Coahuila, Mexico, March, 1905 (Calif.); *J. N. Rose & Jos. H. Painter* 7782, near Aguascalientes, State of Aguascalientes, Mexico, October 10, 1903 (U.S.); *W. E. Safford* 1391, near Guadalajara, Jalisco, Mexico, February 23, 1907 (U.S.; type of *Bidens*

BIDENS CHIAPENSIS Brandeg. (figs. *a–i*)
BIDENS GERANIIFOLIA Brandeg. (figs. *j–o*)

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ramosissima Sherff; nom. vulg., aceitillo); *J. G. Schaffner* 205, State of San Luis Potosí, Mexico, October, 1879 (Berl.; Mun.); *idem* 205*a*, cultivated fields, Mexico, 1880 (Gray; Kew; nom. vernac., aceitillo); *idem* 205*b*, mountains about San Luis Potosí, State of San Luis Potosí, Mexico, 1880 (Gray; Kew); *idem* 206 p.p.; State of San Luis Potosí, October, 1879 (Brit.); *Schmitz* 80 p.p., Valley of Mexico, State of Mexico, 1855 (Brit.); *idem* 541 p.p., Mexico, 1856 (Brit.); *Berthold Seemann*, loco non dicto (Kew); *Eduard & Caecilie Seler* 1184 p.p., Pátzcuaro, Michoacán, Mexico, November 2, 1895 (Berl.).

For many years, Persoon's variety *odoratissima* of *Coreopsis Ferulaefolia* seems to have been unfamiliar to botanists. DeCandolle (loc. cit.) merely mentioned it: "quid sit var. *odoratissima* à Persoonio citata ignoro." Persoon's variety was founded on Cavanilles' plant in Jussieu's herbarium and was said to be native to Peru. This cited specimen I have not found, but there exists in the British Museum of Natural History a good specimen from Cavanilles, labeled "*Coreopsis odoratissima nobis*, Mexico," which matches Persoon's description precisely. The leaves, probably because of having grown under cultivation, are especially slender-divided and give a superficial resemblance to those of *Bidens Ferulaefolia* (Jacq.) DC. The specimen is identical with two other specimens (Brit.) from the herbarium of Cavanilles, one labeled "*Coreopsis odorata* olim *Bidens*," and the other "*Bidens odorata* Cav. Ic. V. 1., nunc *Coreopsis*." Both of these last two are further labeled, in pencil, "*Cosmos odoratus*." Clearly, Persoon's variety is perfectly synonymous with *Bidens odorata* Cav.

Coreopsis multifida DC. and its var. *mutica* DC. are represented by the type specimens in the herbarium of DeCandolle's Prodromus (Del.). The species was collected (fide DC. loc. cit.), by Pavón, possibly in Peru; the variety was from seed previously sent by Dombey from "Peruvia" to the Botanical Garden at Paris. Both are found on careful comparisons to be merely *Bidens odorata* Cav.[1]

[1] The citation of Peru would seem to indicate that the material is really best considered as the rather similar var. *alausensis* f. *Scandicina*, the form native to South America. The plants are more like the North American material of f. *odorata*. Whether a mistake was made originally in the mention of Pavón and Peru for these plants I can not say for certainty, although the indications point that way. We may note the partly comparable case of *Bidens Sambucifolia* Cav., said to have come from Peru and Mexico, but which has never been known from outside of Mexico. The evidence in herbaria indicates that Cavanilles got his material in this case from or rather through Pavón, and thus Pavón's written data were at fault. Regarding another, somewhat different case of mislabeling observed in much of the "Pavón" material cf. Hemsley, Biol. Centr. Amer. Bot. 4: 120. 1887 ("as Pavon himself was never in Mexico, and there is evidence of his having dealt freely in the sale of dried plants").

Bidens Caucalidea DC. was described from *Berlandier* 1138. The sheet of this number in the Museum of Vienna has one specimen with bipinnate leaves, approaching *Bidens odorata* Cav. and another with some of the principal leaves only tripartite, approaching *B. pilosa* var. *bimucronata*. At Washington (U.S.) are two sheets of the fine material collected by Arsène. It is remarkably close to the type material of *B. Caucalidea* and might well serve as a supplementary type for the concept represented by that name. Four of the five specimens there have the leaves mainly bipinnate as in *B. odorata* Cav. but the remaining specimen has the leaves tripartite as in the var. *bimucronata*.[1] Obviously the amount of foliar division is of little value here in determining specific limits. Likewise a study of various other specimens (referred to *B. odorata* Cav. or to *B. Caucalidea* DC. by different botanists), with reference to achenial shape, size, and armature, to width of flowering heads, and to general branching habit, reveals an astonishing amount of variation. A form with the upper part of the main stem broken away and the lower part profusely branched is the plant formerly described as *Bidens Deamii* Sherff. *B. ramosissima* Sherff is probably best interpreted as merely a mutant form with an excessive degree of branching and the involucres finally becoming reflexed to a notably uniform extent. A specimen collected by Seemann (Kew) is positively the *B. odorata* of Cavanilles and yet in its highly branched character displays an approach to the type specimen of *B. ramosissima*.

Certain specimens of *Berlandier* 1138 were rather under-developed in stature, somewhat pubescent-hirtellous, and had the leaf segments more acute. These DeCandolle assumed to be another species, confused with the *B. Caucalidea* material by Berlandier in the gathering. He named them *B. Daucifolia*. For *B. Daucifolia*, as for his *B. Caucalidea*, he described the rays as yellow. Since DeCandolle's day, many (yellow-rayed) Mexican specimens of *B. triplinervia* var. *macrantha* (Wedd.) Sherff have been determined by students (myself among them) as B. *Daucifolia* DC., but recent study of the long neglected type material of *B. Daucifolia* at Geneva (Del.) and Paris (Par.) showed that *B. Daucifolia* is not a yellow-rayed form. The Geneva sheet has a single small specimen, with one flowering and one fruiting head. The ligules are a faded rosaceous color, not yellow as DeCandolle had stated. The achenes are those of *B. odorata* Cav. The Paris sheet has three small but good speci-

[1] Cf. O. E. Schulz in Urban, Symb. Antill. 7: 138. 1911: "*Bidens caucalideus* DC.! . . . . varietati *bimucronato* valde affinis folia pinnatisecta habet."

mens. Three radiate heads are present, of a faded rosaceous color. One specimen has a head of biaristate achenes and another has two ample fruiting heads of exaristate achenes. These specimens all are mere variations of *B. Caucalidea* DC., and there is no reason to suppose that Berlandier confused two sorts with each other. Clearly *B. Daucifolia* DC. and *B. Caucalidea* DC. are synonymous, and together must be equated in turn with the earlier *B. odorata* Cav.

Judged by standards maintained in many other genera, there would seem to be no less than eight or ten varieties and racial formae represented. To encumber taxonomy with a large number of additional names, when the variations are so capricious and fickle as often to result in two or three unlike *facies* upon a single herbarium sheet,[1] would appear entirely unwarranted. Therefore, these varying forms, all of them intimately related to *B. pilosa* var. *bimucronata* but tending to display more or less bipinnate leaves on most of the individual plants, are grouped as the forma *odorata* of that variety. Complicated and undesirable as the name resulting from this interpretation will be,[2] it is the only one that appears to accord with the facts in nature.

The type of *Cosmos tenellus* H.B.K. (or *Bidens Bonplandii* as it was later renamed by Schultz Bipontinus upon its transfer to *Bidens*) was collected between the City of Mexico and Huahuatoca (variously spelled Huehuetoca, Güegüetoque, etc.) in the State of Mexico, Mexico. A search in 1914 and again in 1924 among the type sheets of the Humboldt, Bonpland, and Kunth set at Paris failed to reveal a specimen with the name *Cosmos tenellus,* nor was there authentic material at Berlin. The description by Kunth shows that the type was without achenes. The bipinnatipartite foliage and the probably rosaceous color of the ligules evidently had led him to place the plant in *Cosmos.* A survey of *Cosmos* and *Bidens* at the present time indicates that Kunth's extended description fits none other than the present f. *odorata* of *Bidens pilosa* var. *bimucronata.* This forma, as well as its supravening variety *bimucronata,* is very abundant

[1] *C. V. Hartman* 564 (Gray) and *C. A. Purpus* 1544 (Calif.) are especially good examples of this.

[2] O. Kuntze (Rev. Gen. 1: 322. 1891) put forth a treatment of *Bidens pilosa* in which he adopted the even more complicated and unwelcome method of proposing varieties, subvarieties, and forms (formae). His name *subbiternata* is seen, on carefully reading the related names, to have been used for a subvariety or group (under *B. pilosa*) ranking lower than a variety but higher than a forma (thus cf. *B. pilosa* a. *leucantha* 2. *ternata* f. *pilosior,* loc. cit.). Yet, even were the formal rank of the name *subbiternata* accepted, it could not conflict with the validity of the claim of *odorata* to formal rank, as *subbiternata* pertained to a form of *B. pilosa* var. *radiata,* not of var. *bimucronata.*

throughout the region surrounding the type locality of *Cosmos tenellus*. Moreover, the general aspect is often deceptively like that of *Cosmos*, a fact easily explaining Kunth's reference of his type to that genus.[1]

The type of *Bidens inermis* Wats. is matched by *Pringle* 1638, 5999, and 7904. All four numbers have achenes especially slender and long-attenuate, as well as exaristate. The forma *odorata* is known frequently to produce achenes wholly or in part of this very kind, thus leaving no grounds for the retention of *B. inermis* as a species.[2] It may be remarked that O. E. Schulz, in 1911, studied some of the *B. inermis* material (e.g., *Pringle* 1638) in the Berlin Herbarium and labeled it *B. Caucalidea* DC., which in turn, as already stated, is merely another synonym for f. *odorata*.

The grayish green or bluish green color of the herbage in the forma *odorata* often is very noticeable. The Mexicans appear to prefer this form and also the var. *bimucronata* proper for food. Under the name of "aceitillo" (fide *A. Dugesii* 471, Gray; *Wm. E. Saffordii* 1391, U.S.; et al.), the young plants are boiled and eaten with pinole and salt (fide *C. V. Hartmanii* 564, Gray).

Bidens pilosa var. ϵ. **alausensis** (H.B.K.) Sherff, Bot. Gaz. 81: 35. 1926. Pl. CVI, figs. *i–o*.

Bidens alausensis H.B.K. Nov. Gen. et Sp. 4: 184 (235). 1820.

Bidens valparadisiaca Colla, Mem. Accad. Torin. 38: 12. *pl. 24.* 1835.

Bidens chilensis DC. Prodr. 5: 603. 1836.

Bidens diversifolia Willd. ex DC. op. cit. 602. 1836 (pro parte).

Bidens valparadisea Colla ex Philippi Cat. Pl. Chil. 155. 1881.

Folia pinnato-quinquepartita vel biternatisecta vel tantum pinnatisecta, circumambitu saepe deltoidea; foliolis segmentisve saepius plus minusve ovatis, basi cuneatis alibi grosse et saepe irregulariter inciso-serratis dentibus mucronatis. Capitula radiata pansa ad anthesin circ. 1–2 cm. lata ligulis albidis vel rosaceis vel subalbidis. Achaenia saepius biaristata.

[1] It may be noted that several specimens collected by Brother G. Arsène in the states of Puebla and Michoacán (U.S.) had been distributed by Arsène under the name *Cosmos tenellus* H.B.K. and that these are our f. *odorata*.

[2] The singular aspect of the fruiting heads upon typical "*B. inermis*" might be taken as justifying a subformal rank under f. *odorata*, but the already lengthy name *B. pilosa* var. *bimucronata* f. *odorata* would seem to suggest restraint in this matter. Furthermore, some material (e.g., *Edward Palmer* 673, Kew) has fruiting capitula precisely like those in the type collection of *B. inermis* but merely 3–5-partite leaves as in *B. pilosa* var. *bimucronata* proper, thus displaying an overlapping of characters.

BIDENS OSTRUTHIOIDES (DC.) Schz. Bip.

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Type specimen: Collected by *Alexander Humboldt* and *Aimé Bonpland*, at altitude of 2,340 meters, between Alausi and Tambo de Guamote, Ecuador, 1799–1803 (Par.; for illustration, see Bot. Gaz. 59: 311, *fig. 1.* 1915).

Distribution: The Andes region of western South America from Colombia through Ecuador and Peru to Chile and in southwestern Bolivia; also in the Galapagos Islands.

Specimens examined: *J. Ball*, alt. 3,600–3,900 meters, rocky places of Andes, near Chicla, Peru, April 21–23, 1882 (Kew); *F. W. Beechey*, Valparaíso, Chile (Del.); *Bertero* 95, Ţaqua-taqua, Chile, October, 1828 (Del.); *idem* 845, Quillota, Chile, October–November, 1829 (type material of *Bidens chilensis;* Del.; Par.); *idem* (similiter) 845, forest pastures and upon hilly slopes, Valparaíso, Chile, 1830 (Brit.; Mun.; Mus. V.; N.Y.); *Bridges*, Valparaíso, Chile, 1830 (Kew); *idem* 66, eodem loco, 1832 (Brit.; Kew; Mus. V.); *Otto Buchtien*, eodem loco, August 20, 1895 (Field); *Agnes Calvert*, Valdivia and Valparaíso, Chile (Brit.); *O. F. Cook & G. B. Gilbert* 512, alt. about 3,000 meters, Ollantaitambo, Peru, May 1, 1915 (U.S.); *Cruckshank*, Chile (Kew); *H. Cuming* 646, prope Valparaíso, Chile, 1831 (Brit.; Mus. V.; Webb); *K. Fiebrig* 2049, alt. 1,700 meters, Bermejo, Bolivia, November 15, 1903 (Berl.; forma varietati *bimucronatae* valde adpropinquans; nom. vulg., saitilla); *Frömbling*, Chile, 1886 (Mun., 2 sheets); *Gaudichaud* 164, Valparaíso, Chile, 1834 (Del.; Webb); *Claude Gay* 201, Chile, 1833 (Del.; Gray, 2 sheets); *idem* 341, on hills, Prov. Coquimbo, Chile, August, 1829 (Par.); *idem* 355, on hills, Chile (Par.); *W. H. Harvey*, Valparaíso, Chile, April–July, 1856 (Gray); *Humboldt & Bonpland*, alt. 2,340 meters, between Alausi and Tambo de Guamote, Ecuador, 1799–1803 (type and cotype, Par.: cotypes, Berl., 2 sheets); *iidem*, Llactacunga (Latacunga), Ecuador (Berl., sub nom. *Bidente quitensi*); *E. P. Killip* 6761, alt. 2,900–3,200 meters, in open, "Canaan," Mt. Puracé, near Río Anambiu, Dept. El Cauca, Colombia, June 11–16, 1922 (U.S.); *idem & A. C. Smith* 18101, alt. 3,500 meters, oak forest, La Baja, Dept. Santander, Colombia, January 14–31, 1927 (U.S.); *G. Looser* 148, Cerro Cruz, Limache, Prov. Valparaíso, Chile, October 12, 1926 (Gray); *J. F. Macbride* 2902, on slide rock, alt. about 2,400 meters, Matucana, Peru, March 14–18, 1923 (Field); *James Macrae*, near Valparaíso, Chile, 1825 (Kew); *Mathews* 465, Lima, Peru, communic. 1833 (Del.); *idem* (similiter) 465, interior Peru, 1862 (N.Y.); *idem* 468, Purruchuco, Peru (Kew); ex *herb. Johanni Miersii* 67, Concón, Chile (Brit.); *Moseley* (*Challenger Expedition*), Juan

Fernández, Chile, November, 1875 (Kew); *Macbride & Featherstone* 2139, alt. about 3,150 meters, common on hillsides and stream banks, 15 miles southeast of Huánuco, Peru, May 31–June 3, 1922 (Field); *F. W. Neger*, Concepción, Chile, July 20, 1895 (Mun.); *F. Philippi*, Valparaíso, Chile, 1894 (Brit.); *G. H. Pring* 31, San Cristóbal, Sabana de Bogotá, Colombia, May, 1923 (Mo.); ex *herb. E. C. Reedii*, Juan Fernández, Chile, October, 1872 (Petrop.); *Dr. & Mrs. J. N. Rose* 19114, near Valparaíso, Chile, September 14, 1914 (N.Y.; U.S.); *Lud. Savatier*, Canruru, Peru (Kew, 2 sheets); *R. E. Snodgrass & E. Heller* 887, alt. 1,200 meters, Tagus Cove, Albemarle Isl., Galapagos Isls., June 15, 1899 (Gray); *A. Sodiro*, sandy fields among Andes, near Pomasqui, Ecuador, February, 1896 (Berl., cum f. *scandicina* lecta); *idem* 486, in cultivated places, Niebly-Perucho, Ecuador, June, 1904 (N.Y.); *Alban Stewart*, Valparaíso, Chile (Petrop.); *idem* 716, abundant in thickets at alt. 1,200 meters, Tagus Cove, Albemarle Isl., Galapagos Isls., March 24, 1906 (Brit.; Mo.); *Styles*, Chile (Phila.); *Wawra* (*H. M. Frigate "Donau"*), Valparaíso, Chile, 1868–1871 (Mus. V.); *A. Weberbauer* 50, Matucana, Peru, December 24, 1901 (Berl.).

The Willdenow Herbarium has a sheet of *Bidens diversifolia* Willd. (ex DC.) and this sheet bears two plants. One is referable to var. *alausensis*, but the other seems more like *B. andicola* H.B.K. Willdenow doubtless construed them to be genetically the same, hence his name *diversifolia*. It appears, however, that this was merely a case of mixed material. Fortunately, the very definite status and validity of the names *alausensis* and *andicola* permit us to ignore the name *B. diversifolia* Willd.

In a former article (Bot. Gaz. 59: 310–311, *fig. 1.* 1915) I have discussed the identity of *B. valparadisiaca* Colla and *B. chilensis* DC. with *B. alausensis* H.B.K., and presented photographs of Kunth's type of *B. alausensis* H.B.K. In 1924 I made a careful reexamination of Kunth's type and of four sheets of cotype material (Par.; Berl.) and came to the same conclusion as before. A study of various other specimens shows that *B. alausensis* H.B.K. cannot properly be regarded as specifically distinct from *B. pilosa* L. Thus, for example, *J. F. Macbride* 2899 and 2901, at altitude of about 2,400 meters, Matucana, Peru, etc. (Field),[1] have tripartite leaves

[1] These and the other Macbride specimens cited were obtained by Mr. Macbride, who had the matter particularly in mind on his recent South American expedition. Of each number I have seen various duplicates awaiting distribution to other herbaria.

BIDENS OSTRUTHIOIDES var. COSTARICENSIS (Benth. *ex* Oerst.) Sherff

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and are a form[1] of *B. pilosa* var. *radiata* Schz. Bip. But *Macbride* 2902 (Field), collected at the same place and same time as *Macbride* 2899 and 2901, has the foliage mostly bipinnatisect, and is very close to or identical with various specimens of *B. alausensis* H.B.K. from Chile and Ecuador.[2] *Macbride* 2900 p.p., altitude about 2,400 meters, Matucana, Peru, March 14–18, 1923 (Field), and 3473, altitude about 2,550 meters, Cani, Peru, April 16–26, 1923, also are identical in habit and technical characters with *B. alausensis*, except that they are taller and more robust and their foliage is more finely cut, becoming even tripinnatisect. These are identical with *A. D'Orbigny* 1234, Bolivia (Par.), labeled *Bidens Scandicina* var. *glabrescens* by Weddell. They match also the Berlin and Paris cotypes of *B. Scandicina* H.B.K., except that the latter have more pubescent leaves with somewhat finer divisions. It is significant that the types of *B. alausensis* H.B.K. and *B. Scandicina* H.B.K., here seen to be so closely connected by intermediate specimens, were collected by Humboldt and Bonpland in the same vicinity: *B. alausensis* between Alausi and Tambo de Guamote (the type label gives merely "Alausi"), Ecuador, and *B. Scandicina* between Llactacunga and Ambato, Ecuador.

It might seem at first that there is here a situation comparable with that in *B. pilosa* var. *bimucronata* (Turcz.) O. E. Schulz, where the form with finely divided leaves is reducible to subordinate rank as f. *odorata* (Cav.) Sherff. In such a case we should have the names *alausensis* and *Scandicina* taking respectively formal and subformal rank under the name *B. pilosa* var. *radiata*, giving names which would be very cumbersome. It seems more probable that in the present case the *alausensis* and *Scandicina* forms do not intergrade nearly so much with *B. pilosa* var. *radiata* as does the *odorata* form with *B. pilosa* var. *bimucronata*. Hence there appears good reason for assigning *B. alausensis* varietal status directly under *B. pilosa*, and reducing *B. Scandicina* to a forma under the variety.

Bidens pilosa var. ϵ. **alausensis** f. 1. **Scandicina** (H.B.K.) Sherff, Bot. Gaz. 81: 36. 1926. Pl. CVII.

Bidens Scandicina H.B.K. Nov. Gen. et Sp. 4: 184 (235). 1820.

Folia plus dissecta, saepe tripinnatisecta, segmentis angustioribus.

[1] Having rays mostly 5–8 mm. long and slightly more yellowish than usual in the var. *radiata*. They suggest in the ray characters the allied forms that pass under the name *B. pilosa* var. *minor* (Bl.) Sherff.

[2] See also remarks under *B. pilosa* var. *Apiifolia* (DC.) Sherff.

Type specimen: Collected by *Alexander Humboldt* and *Aimé Bonpland*, between Llactacunga (Latacunga) and Ambato, Ecuador, 1799–1803 (Par.).

Distribution: Ecuador, Peru, and Bolivia.

Specimens examined: *Otto Buchtien*, alt. 3,500 meters, LaPaz, Bolivia, May, 1911 (Mun.); *idem* 125, alt. 3,460 meters, eodem loco, March 8, 1919 (Field); *idem* 355, alt. 3,600 meters, San Jorge, La Paz, Bolivia, October 10, 1921 (Field; Gray); *idem* 378, alt. 3,460 meters, La Paz, March 8, 1919 (Field, 2 sheets); *idem* 811, eodem loco et tempore (Field, 2 sheets; Gray; Mo.; N.Y.);[1] *Const. de Jelski* (*distrib. Ign. de Szyszylowicz* 657 and 735), Cutervo, Peru, April, 1879 (Berl.); *Alcide D'Orbigny* 1234, Dept. Chuquisaca, Bolivia, February (Par., sub nom. *B. Scandicina* var. *glabrescenti* Weddell); *F. L. Herrera*, Valley of the Apurímac, Dept. Cuzco, Peru, February 29 (Field); *Humboldt & Bonpland*, between Llactacunga and Ambato, Ecuador, 1799–1803 (type, Par.: cotypes, Berl. 2 sheets; Par., 2 sheets; Willd., 2 sheets); *Otto Kuntze*, alt. 3,000 meters, near Cochabamba, Bolivia, March 26, 1892 (N.Y.); *J. F. Macbride* 2900 pro parte, very rocky valley floor, alt. 2,400 meters, Matucana, Peru, March 14–18, 1923 (Field, cum var. *alausensi* ipsa lecta); *idem* 3473, alt. about 2,550 meters, Cani (town 7 miles northeast of Mito), Peru, April 16–26, 1923 (Field); *Rivet* 29, Caripacunga, vicinity of Quito, Ecuador, February 19–21, 1902 (Par., 2 sheets); *idem* 245, Quito, Ecuador, October, 1902 (Par.); *A. Sodiro*, in fields among the Andes, near Pomasqui, Ecuador, February, 1896 (Berl., 2 sheets; cum var. *alausensi* ipsa lecta).

For remarks about this form, see under var. *alausensis* above.

Bidens pilosa var. ζ. **Apiifolia** (DC.) Sherff, Bot. Gaz. 85: 1. 1928.

Bidens chilensis var. *Apiifolia* DC. Prodr. 5: 604. 1836.

Varietas inter varietates *radiatam* et *alausensem* omnibus characteribus labans (forsan hybrida?).

[1] In the Buchtien specimens the similarity to certain Umbelliferae, implied in the name *Scandicina*, is most striking. In fact, before seeing the Sodiro (cf. Hieronymus, Bot. Jahrb. 29: 48. 1901) and de Jelski specimens, I had not thought to connect the Buchtien specimens with f. *Scandicina*, and had tentatively considered them as representing a new species. Curiously enough, I too had been impressed with the resemblance to certain Umbelliferae, especially *Musineon*, and, to a lesser extent, *Chaerophyllum*, and had tentatively employed a trivial name based upon the resemblance to *Musineon*. In one specimen by Buchtien (No. 811) the foliage and general habit suggest also those of *Anthemis Cotula* L.

BIDENS BICOLOR Greenm.

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Type specimen: Collected by *Eduard Poeppig*, No. 207, in rocky and gravelly maritime places near Valparaíso, Chile, June (Del.).

Distribution: Known only from Chile.

Specimens examined: *Erik Asplund* 42, Valparaíso, July 17, 1921 (Stockh.); *Poeppig* 207 (type, Del.: cotypes, Berl.; Hll.; Kiel; Mus. V., etc.).

In a former article (Bot. Gaz. 76: 158. 1923), *Bidens chilensis* var. *Apiifolia* DC. was discussed and the Berlin cotype (*Poeppig* 207) of that variety was treated as "an unimportant foliage form of *B. alausensis.*" Subsequent study of much cotype material, in conjunction with several specimens collected by *J. F. Macbride* at Matucana, Peru, revealed closer affinities of several of the original specimens with *B. pilosa* var. *radiata* Schz. Bip. Specimens of *Poeppig* 207 were studied in collections belonging to several of the older herbaria. Two specimens in Vienna and one in Berlin appeared closer to var. *alausensis*, but the cotypes elsewhere appeared, when studied in the light of the interesting Macbride specimens previously described (cf. Bot. Gaz. 81: 35. 1926), to be closer to var. *radiata*.

The nomenclatural problem offered by the publication in 1836 by DeCandolle of this var. *Apiifolia* is particularly vexing, since its publication antedated that for both the var. *alausensis* and the var. *radiata*. An equation of the var. *Apiifolia* with either of these two varieties would compel the taking up of the name *Apiifolia* and the reduction of a well established name to synonymy. The intermediate nature and ill defined status of the var. *Apiifolia* would make such a course seem unwise, if not indeed impossible. Apparently the interests of taxonomy are best conserved by employing the combination *B. pilosa* var. *Apiifolia* to apply only to the form intermediate between vars. *alausensis* and *radiata*, and represented by Poeppig 207. In this case, the last two names, each certain in its application and well supported in herbaria by illustrative material, are left undisturbed.[1]

Bidens pilosa var. *η*. **calcicola** (Greenm.) Sherff, Bot. Gaz. 80: 377, *pl. 20*. 1925. Pl. CVIII and Pl. CIX, figs. *a* and *c–j*.

Cosmos pilosus H.B.K. Nov. Gen. et Sp. 4: 189 (241). 1820.

Bidens exaristata DC. Prodr. 5: 600. 1836.

Bidens brachycarpa DC. loc. cit.

[1] Concerning the intermediate nature of var. *Apiifolia*, it may be remarked that while DeCandolle ranked this variety under *B. chilensis* DC. (=*B. pilosa* var. *alausensis*), Poeppig's original printed labels bore the name "*B. leucantha* L." (=*B. pilosa* var. *radiata*).

Bidens rosea Schz. Bip. in Seemann, Bot. Voy. Herald 308. 1852–1857.

Bidens rosea var. *calcicola* Greenm. Proc. Amer. Acad. 41: 264. 1905.

Bidens pilosa var. *brachycarpa* (DC.) O. E. Schulz in Urban, Symb. Antill. 7: 138. 1911.

Bidens orendaniae Jones, Extracts Contr. West. Bot. 18: 82. 1933.

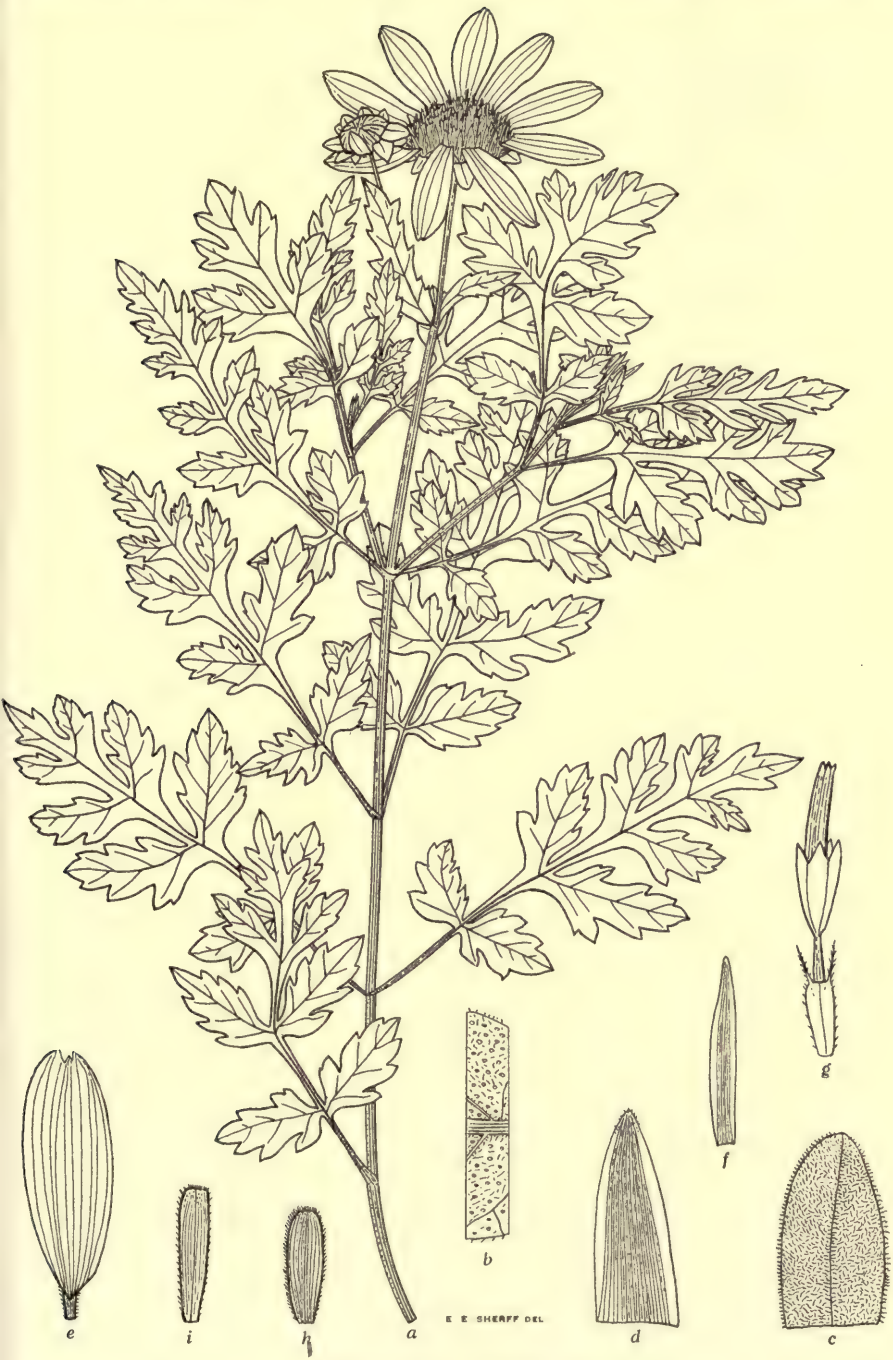
Planta gracilis 1.5–6 dm. alta. Folia saepe minora, foliolo terminali plerumque 1–3.5 cm. longo. Capitula plerumque radiata radiis albidis vel rosaceis, pansa ad anthesin tantum 1–1.5 cm. lata. Achaenia parva, corporibus 4–9 mm. longa,[1] biaristata aristis 1–1.5 mm. longis.

Type specimen: Collected by *Cyrus Guernsey Pringle*, No. 11340, at altitude of 1,200 meters, on limestone hills, Yautepec, near Cuernavaca, State of Morelos, Mexico, October 21, 1902 (Gray).

Distribution: In Mexico from the states of Tamaulipas, San Luis Potosí, and Nayarit southward to the states of Vera Cruz, Oaxaca, and Guerrero; also in Guatemala, Costa Rica, and Colombia; in the states of Rio Grande do Sul and São Paulo, Brazil, where apparently adventive.

Specimens examined: *Berlandier* 5 and 113, Tampico, Tamaulipas, Mexico, in 1827 (Del., 2 sheets; Par.; Webb; type collection of *Bidens brachycarpa* DC.); *idem* 39, Mexico (Par.); *idem* 800, Mexico (Gray; Mo.); *idem* 2220, between Victoria and Tula, Tamaulipas, Mexico, November, 1830 (Del., 2 sheets; Gray; Par.); *Bourgeau* 2253, Valley of Córdoba, Mexico, April 16, 1866 (Par.); *J. J. Cooper* 5814 p.p., alt. 1,275 meters, Cartago, Prov. Cartago, Costa Rica, December, 1887 (Berl.; Field; Gray; forma radiis parvis vel deficientibus); *G. M. Emrick* 145, Hacienda Coahuayula, Michoacán, Mexico, February, 1901 (Field); *J. M. Greenman* 174, near Córdoba, Vera Cruz, Mexico, January 25, 1906 (Field); *idem & M. T. Greenman* 5312, San Pedro, east of San José, Costa Rica, January 25, 1922 (Mo.); *J. Gregg* 430, Mexico, September 3, 1848 (Mo.); *Carl Heller* 37, alt. 900 meters, in meadows, Mirador, Vera Cruz, Mexico (Par.; Mus. V.); *Heyde & Lux* 3788, alt. 1,050 meters, Cerro Gordo, Dept. Santa Rosa, Guatemala, September, 1892 (Gray; Mun.); *idem* 6172, alt. 800 meters, Cuijiniquilapa, Dept. Santa Rosa, Guatemala, November, 1893 (Boiss.; Brit.; Field; Gray); *Hoehne & Gehrt* 23904, São Vicente, Santos, São Paulo, Brazil, March 28, 1929 (U.S.); *Carl Hoffmann* 742, San José, Costa Rica, April, 1857 (Berl.);

[1] O. E. Schulz (loc. cit.) and DeCandolle (loc. cit.) both give the achenial length as about 6 mm. ("3 lin."), but cotype material of *B. brachycarpa* DC. (Par.) has many fruiting heads with achenes having bodies 8–9 mm. long.



BIDENS HOLSTII (O. Hoffm.) Sherff

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Humboldt & Bonpland, alt. 2,340 meters, in arid places, near Santa Rosa de la Sierra, near western boundary of State of Guanajuato (cf. H.B.K. Nov. Gen. et Sp. 7: 434 et 456. 1825), September, 1803–1804 (Par.; type of *Cosmos pilosus* H.B.K. and hence of *Bidens rosea* Schz. Bip.); *M. E. Jones* 27770, Orendain, Jalisco, Mexico, November 27, 1930 (Pom.; type of *Bidens orendaniae* Jones); *H. Karsten*, Quindío, Colombia (Petrop.); *E. Kerber* 9, Córdoba, Vera Cruz, Mexico, July 22, 1882 (Berl.; Boiss.; Brit.; Cop.; Del.; Mun.; Par., 3 sheets; Mus. V., etc.); *F. M. Liebmann* 640, Colipa, Vera Cruz, Mexico, March, 1841 (Cop., 2 sheets); *idem* 641, Papantla, Vera Cruz, June, 1841 (Cop.); *idem* 643, Mirador, Vera Cruz, January, 1843 (Cop.; Klatt's sketch in Gray); *idem* 651, Tehuacán, Puebla, Mexico, December, 1841 (Cop.); *Fred Müller* 238, Orizaba, Vera Cruz, Mexico, 1853 (N.Y.); *idem* 544 p.p., eodem loco, 1855 (N.Y.); *E. W. Nelson* 2111, alt. 1,350–1,710 meters, between Tlapa and Ayusinapa, Guerrero, Mexico, December 13, 1894 (Gray); *idem* 6868, Los Reyes, Michoacán, Mexico, February 8–12, 1903 (Gray; foliis glabris et valde membranaceis); *Edward Palmer*, Terr. Tepic (Nayarit), January 5–February 6, 1892 (U.S.); *idem* 68, alt. about 15 meters, vicinity of Tampico, Tamaulipas, Mexico, January, 1910 (Mo.; N.Y.); *idem* 192, Alvarez, San Luis Potosí, Mexico, September 28–October 3, 1902 (Gray); *Parkinson*, Mexico (Kew); *C. G. Pringle* 11340 (type, Gray); *E. M. Reineck*, Porto Alegre, Rio Grande do Sul, Brazil, November, 1898 (Gray); *Rose, Painter, & Rose* 10061, near Tomellín, Oaxaca, September 4–5, 1905 (U.S.); *W. W. Rowlee & H. E. Stork* 842, Juan Vinas, Costa Rica, August 30, 1920 (N.Y.); *H. E. Seaton* 419, alt. 810 meters, Córdoba, Vera Cruz, Mexico, August 20, 1891 (Field; Gray; Kew; N.Y.); *Eduard & Caecilie Seler* 682, vicinity of Gallinas, Distr. Ciudad del Maíz, San Luis Potosí, Mexico, February, 1888 (Berl.); *Sinclair*, San Blas, Terr. Tepic, Mexico (Kew); *Ad. Tonduz* 14779, alt. 1,400 meters, Ferme de Guácimo, Costa Rica, July 30, 1901 (Boiss.; forma capitulis discoideis).

Greenman (loc. cit.) lists *Palmer* 192, *E. W. Nelson* 6868, and *Heyde & Lux* 6172 (all in Gray) as representing *Bidens rosea* Schz. Bip. (*Cosmos pilosus* H.B.K.). Without discussing *B. rosea* Schz. Bip., the immature type of which (Par.) is especially well matched by the Palmer plant, it is sufficient here to state that these specimens are referable to *Bidens brachycarpa* DC. The type and cotype specimens of *B. brachycarpa* DC. (Del.; Par., etc.), with their small leaves, small heads, more or less rosaceous ligules, and small, exaristate, upwardly attenuate achenes, appear widely different from

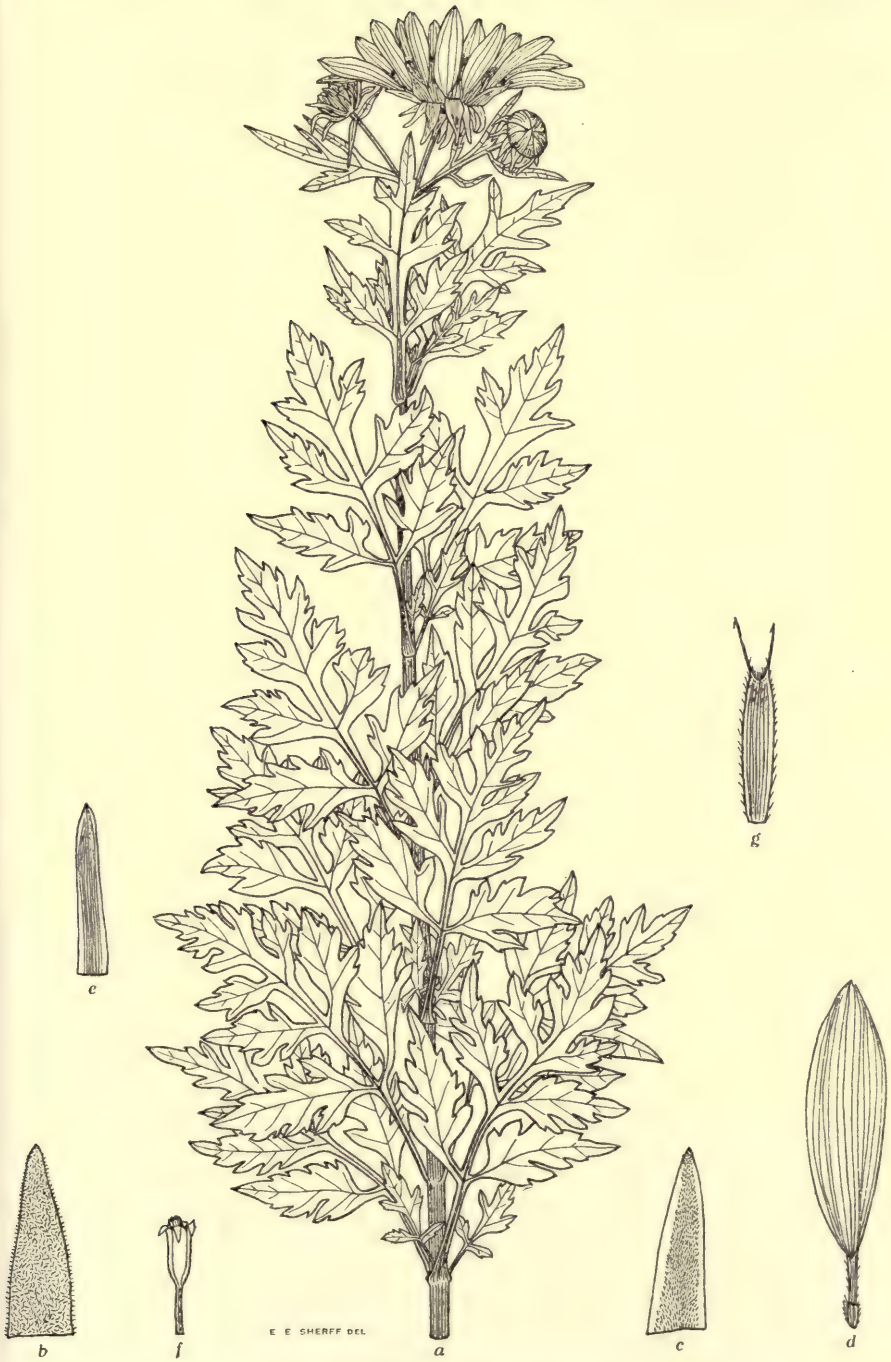
typical *B. pilosa* L. A study of the other herbarium specimens cited above, however, shows it to be impossible to maintain separate specific rank for them; rather must they be given varietal rank under *B. pilosa* as was done by O. E. Schulz (loc. cit.). According to the International Rules, the earlier varietal name *calcicola* must be applied here.[1] The type of the var. *calcicola*, *Pringle* 11340 (Gray), has a single pair of stem leaves present, these pinnately 5-parted, with the terminal and basal leaflets more or less definitely 3-parted; the divisions are lanceolate; the involucres are rather densely canous-pubescent. These characters are found to be duplicated in various of the specimens above.

DeCandolle appears to have attached undue importance to the amount of scabridity on the achenial surfaces. Thus he placed *Berlandier* 5 and 113, with achenes scabrous, in his new species *B. brachycarpa*, but *Berlandier* 2220, with achenes less glabrous[2] and happening to have a taller, more corymbose habit, with the terminal leaflets more elongate, he described separately under the new name *B. exaristata*. The technical characters of flowers and fruit offer no warrant for maintaining *B. exaristata* as a separate species or variety apart from the var. *calcicola*. As to the somewhat taller habit and more corymbosely or even fastigiately branched inflorescence observed in certain specimens (*Berlandier* 39, Del., Par.; *idem* 2220, Del., Par.; *Nelson* 2111, U.S.), these seem to be merely the result of a capricious growth. Indeed, *Berlandier* 800 and 2220 in the Gray Herbarium have a much more loosely corymbose inflorescence as, in fact, DeCandolle's description states ("laxe corymbosa"), and thus at once remove from consideration the only character that by some botanists might be thought important. Through the first Berlandier specimen just cited (No. 800) an approach is made to *B. pilosa* var. *bimucronata* (Turcz.) O. E. Schulz, a variety

[1] The Berlin Herbarium has several specimens of *B. pilosa* (leg. *Sello* et al.) with mature achenes only 4–5 mm. long and closely simulating the var. *calcicola* plants in all important respects except that they lack rays. Similarly, various herbaria have plants of the var. *radiata* with diminutive, commonly pubescent leaves and many of the fruiting heads minute, approaching the var. *calcicola* type so closely as practically to efface all varietal distinctions. The Tonduz specimens might almost equally well be regarded as of the species proper, and in fact had been treated as that by me until the same local form appeared again during further studies (*Cooper* 5814), with some of the heads radiate.

[2] DeCandolle (loc. cit.) actually described the achenes as glabrous ("achaeniis glabris"), but in two sheets of *Berlandier* 2220 (Del.), many of the achenes are distinctly scabrous near the apex.

O. E. Schulz (loc. cit.), evidently relying upon DeCandolle, likewise regarded *B. exaristata* as having glabrous achenes. Thus he stated: "*B. exaristatus* DC. . . . ab hac varietate [*B. pilosa* var. *bimucronata*] acheniis glabris differt."



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which has the heads usually larger, the leaves more often glabrous or subglabrous, and the lateral leaflets (in the variety proper) typically undivided.

Bidens pilosa var. *η.* **calcicola** f. 1. **dissecta** Sherff, Bot. Gaz. 80: 379. 1925. Pl. CIX, fig. *b*.

A varietate differt: foliis bipinnatis vel etiam tripinnatisectis, segmentis linearibus vel anguste lanceolatis.

Type specimen: Collected by *Heyde & Lux*, No. 6164, at altitude of 1,300 meters, Malpais, Department of Santa Rosa, Guatemala, November, 1893 (Gray).

Distribution: State of Michoacán, Mexico, southeastward to Guatemala.[1]

Specimens examined: *Bro. G. Arsène* 3164, alt. 1,900 meters, flooded places to the east of Morelia, Michoacán, October 7, 1909 (Gray; N.Y.); *Bernoulli & Cario* 1551, Quezaltenango, Guatemala, July, 1876 (Kew); *Heyde & Lux* 6164 (type, Gray: cotypes, Berl., 2 sheets; Boiss., 4 sheets; Brit.; Cop.; Field; Kew); *iidem* 6170, alt. 1,600 meters, La Vega, Department of Santa Rosa, Guatemala, September, 1893 (Berl.; Boiss.; Brit.; Gray; Kew); *L. H. MacDaniels* 114, alt. 1,650 meters, along Cuernavaca-Taxco Road, about 10 miles from Taxco, Guerrero, Mexico, August 19, 1935 (Field); *E. W. Nelson* 6868 (N.Y.); *Schaffner*, Mexico (Berl.); *Eduard & Caecilie Seler* 1184 p.p., Pátzcuaro, Michoacán, November 2, 1895 (N.Y.).

A form comparable with the var. *calcicola* in much the same way that the bipinnately leaved f. *odorata* of *B. pilosa* var. *bimucronata* (Turcz.) O. E. Schulz is comparable with that variety. Indeed, of the var. *bimucronata* and its form with more compound foliage (i.e., f. *odorata*), there are found at times stunted or dwarfed specimens which have flowering and fruiting heads diminutive enough to be taken for var. *calcicola* and f. *dissecta*. It is therefore possible that in some of my past herbarium determinations I may have confused the two varieties and their respective forms to a slight extent.[2]

EXPLANATION OF PLATE XCIX, FIG. *b*

Bidens pilosa: 5-partite cauline leaf, with lowermost leaflets 2-partite, approaching those in *B. biternata*, ×0.7; from sheet in Hb.

[1] Among specimens additional to those listed and found to be true f. *dissecta*, but omitted because of the uncertainties connected with the written data (cf. Standley, Science n. ser. 65: 130. 1927), was a fine specimen purporting to be by *Fr. Nicolás*, Moulin d'Huexotitla, vicinity of Puebla, July 15, 1909 (Kew). Aside from this plant, I have seen no authentic Mexican material known definitely to have come from elsewhere than the states of Michoacán and Guerrero.

[2] For var. *calcicola* and f. *dissecta* I have, in various herbaria, used until recently the name *B. pilosa* var. *brachycarpa* (DC.) O. E. Schz., etc.

Linn. (where properly treated as *Bidens pilosa* but labeled on reverse side "Rumph. amb. 6, *t.* 15").

EXPLANATION OF PLATE CII

Bidens pilosa, figs. *a*, *b*, *e–j*: *a*, flowering and fruiting specimen, ×0.69; *b*, separate leaf, ×0.69; *e*, exterior involucral bract, ×3.43; *f*, interior involucral bract, ×3.43; *g*, palea, ×3.43; *h*, disc floret, ×3.43; *i* (outer), *j* (inner), achenes, ×3.43; all from *Maxon* 724, in Hb. U.S.

Bidens pilosa var. *minor*, figs. *c*, *d*, *k–r*: *c*, *d*, separate leaves, ×0.69; *k*, flowering and fruiting specimen, ×0.69; *l*, exterior involucral bract, ×3.43; *m*, interior involucral bract, ×3.43; *n*, ray floret, ×3.43; *o*, palea, ×3.43; *p*, disc floret, ×3.43; *q* (outer), *r* (inner), achenes, ×3.43; *c*, *d*, from *Sodiro* 4314 (type of *Bidens pilosa* var. *brevifoliata* Hieron.), in Hb. Berl.; *k–r*, from *Eggers* 208, in Hb. Kew.

EXPLANATION OF PLATE CIII, FIGS. *a–h*

Bidens pilosa var. *radiata*: *a*, flowering and fruiting specimen, ×0.7; *b*, 5-partite leaf, ×0.7; *c*, exterior involucral bract, ×5.56; *d*, interior involucral bract, ×5.56; *e*, ray floret, ×3.48; *f*, palea, ×5.56; *g*, disc floret, ×5.56; *h*, achene, ×3.48; *a*, *c–h*, from *Bitting* 1297, in Hb. Field; *b*, from type of *Bidens leucantha* (L.) Willd., in Hb. Linn.

EXPLANATION OF PLATE CIV, FIGS. *a–i*

Bidens pilosa var. *bimucronata*: *a*, *b*, lower and upper portions of same flowering and fruiting specimen, ×0.68; *c*, exterior involucral bract, ×6.79; *d*, interior involucral bract, ×6.79; *e*, ray floret, ×3.4; *f*, palea, ×4.07; *g*, disc floret, ×4.07; *h*, *i*, achenes differing length of awns, ×4.07; all from *Ehrenberg* 771, in Hb. Berl.

EXPLANATION OF PLATE CV

Bidens pilosa var. *bimucronata* f. *odorata*: *a*, flowering and fruiting specimen, ×0.58; *b*, lower cauline leaf, ×0.58; *c*, portion of stem and portion of adjacent leaf, magnified to show details, ×1.75; *d*, exterior involucral bract, ×3.49; *e*, interior involucral bract, ×3.49; *f*, ray floret, ×3.49; *g*, palea, ×3.49; *h*, disc floret, ×3.49: *i*, anthers, ×17.46; *j*, pollen grain, ×336; *k*, upper portion of pistil, ×17.46; *l* (outer), *m* (inner), achenes, ×4.14; all from *Pringle* 1291 (cotype of *Bidens inermis* Wats.), in Hb. Field.

EXPLANATION OF PLATE CVI

Bidens pilosa var. *bimucronata* f. *odorata*, figs. *a–h*: *a*, flowering and fruiting specimen, ×0.66; *b*, exterior involucral bract, ×3.98;

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c, interior involucral bract, ×3.98; *d*, ray corolla, ×2.66; *e*, palea, ×3.98; *f*, disc floret, ×3.98; *g* (outer), *h* (inner), achenes, ×3.98; *a*, mainly from *hb. Cavanilles* (original material of *Bidens odorata* Cav.), in Hb. Brit., but slightly from *Orcutt* 3657, in Hb. Mo.; rest from *Orcutt* 3657, ibid.

Bidens pilosa var. *alausensis*, figs. *i–o*: *i*, flowering and fruiting specimen, ×0.66; *j*, exterior involucral bract, ×3.98; *k*, interior involucral bract, ×3.98; *l*, ray corolla, ×3.98; *m*, portion of palea, ×3.98; *n*, disc floret, ×3.98; *o*, achene, ×3.98; *i*, mainly from type but partly from cotype, in Hb. Par.; *j–o*, from *Bertero* 845, in Hb. Gray.

EXPLANATION OF PLATE CVII

Bidens pilosa var. *alausensis* f. *Scandicina*: *a*, flowering and fruiting branch, ×0.61; *b–d*, diverse leaves, ×0.61; *e*, exterior involucral bract, ×3.68; *f*, interior involucral bract, ×3.68; *g*, ray corolla, ×3.68; *h*, palea, ×3.68; *i*, disc floret, ×3.68; *j* (outer), *k* (inner), achenes, ×3.68; *a*, from *De Szyszylowicz* 657, in Hb. Berl.; *b*, *e–k*, from *De Szyszylowicz* 735, ibid.; *c*, *d*, from *Sodiro*, near Pomasqui, Ecuador, February, 1896, 2 sheets, ibid.

EXPLANATION OF PLATE CVIII

Bidens pilosa var. *calcicola*: *a*, flowering and fruiting specimen, ×0.59; *b*, exterior involucral bract, ×4.13; *c*, interior involucral bract, ×4.13; *d*, ray floret, ×4.13; *e*, palea, ×4.13; *f*, disc floret, ×4.13; *g* (outer), *h* (inner), achenes, ×4.13; *a*, from *Kerber* 9, in Hb. Berl.; *b–h*, from *Berlandier* 5 and 113 (cotypes of *Bidens brachycarpa* DC.), in Hb. Par.

EXPLANATION OF PLATE CIX, FIGS. *a–j*

Bidens pilosa var. *calcicola*, figs. *a*, *c–j*: flowering and fruiting specimen, ×0.62; *c*, lower surface of portion of leaf from *a*, showing pubescence, ×1.24; *d*, exterior involucral bract, ×3.71; *e*, interior involucral bract, ×3.71; *f*, ray corolla, ×3.71; *g*, palea, ×3.71; *h*, disc floret, ×3.71; *i* (outer), *j* (inner), achenes, ×3.71; all from *Heyde* and *Lux* 6172, in Hb. Gray.

Bidens pilosa var. *calcicola* f. *dissecta*, fig. *b*: a single leaf, ×0.62; from type.

133. **Bidens subalternans** DC. Prodr. 5: 600. 1836. Pl. CX.

Bidens quadrangularis DC. loc. cit.

Bidens platensis Mang. An. Mus. Buenos Aires 24: 230. 1913.

Bidens megapotamica O. E. Schulz, Bot. Jahrb. 50, Suppl.: 182. 1914 (non Spreng.).

Folia unipinnata.....var. γ. *unipinnata.*
Folia plus minusve bipinnata.

Foliorum segmenta plerumque linearia.....var. β. *simulans.*

Foliorum segmenta saepius lanceolata.*B. subalternans* sensu stricto.

Herba annua, erecta, ramosa, 4–10 (vel etiam fere usque ad 30) dm. alta, caule tetragono glabro vel sparsim hispido. Folia petiolata petiolis usque ad 5.5 mm. longis, petiolo adjecto 6–21 cm. longa, bipinnatifida vel subsimpliciter pinnata; segmentis membranaceis, breviter et dense vel remote hispidis, plus minusve dentatis vel irregulariter lobulatis, infra pallidioribus, terminalibus plerumque elongato-lanceolatis vel elongato-linearibus, acuminatis, lateralibus saepe angustioribus. Capitula non numerosa, ramos terminantia, pedunculata pedunculis 1–4 cm. longis, discoidea vel subradiata, ad anthesin 8–10 mm. lata et 5–6 mm. alta, demum cum achaeniis circ. 1.7 cm. lata et circ. 1.6 cm. alta. Involucri bracteae subaequales, exteriores circ. 8, anguste lineares, ciliatae, plus minusve hispidae, acute vel subobtuse calloso-apiculatae, demum 4–6 mm. longae, interiores lineari-lanceolatae. Flores ligulati albidi vel albido-flavi et rudimentarii, saepe deficientes. Achaenia non pauca (30–50), linearia, tetragona, sulcata, atra, glabra vel superne leviter hispida, corpore exteriora 6–8 mm. interiora 8–14 mm. longa et paleas facile superantia, plerumque 4- (rarius 2–3-) aristata aristis erectis vel suberectis retrorsum hamosis 1–2.5 mm. longis.

Type specimen: Collected by *Philip Salzmann,* in cultivated places about Bahia, Brazil, in 1830 (Del.).

Distribution: Uruguay and central Argentina to northern and western Brazil; found long ago (*MacGillivray*) on the Isle of Pines in the West Indies.

Specimens examined: *José Arechavaleta* 4123, Montevideo, Uruguay, March, 1874 (Kew); *Banks & Solander,* Rio de Janeiro, Brazil, 1768 (Brit.); *C. Bettfreund & Isolina Köster* 460 and 461, Almagro-Flores, Buenos Aires, Argentina, communic. 1889 (Berl.); *Blanchet* 51, Bahia, Brazil (Del.); *idem* 195, eodem loco, 1831 (Del.); *Bowie & Cunningham,* Monte de Santa Theresa, Rio de Janeiro, Brazil, February 10, 1815 (Brit.); *Otto Buchtien* 4167 and 4182, alt. 1,300 meters, Milluguaya, North Yungas, Bolivia, December, 1917 (Field); *R. E. Fries* 1084, shady, wet place among bushes, Tarija, Bolivia, January 16, 1902 (Petrop.; Stockh., 2 sheets); *idem* 1456, among bushes at edge of forest, Gran Chaco, Tatarenda, Bolivia, March 25, 1902 (Petrop.; Stockh., 2 sheets; U.S.); *Galander,* Córdoba, Argentina, November 30, 1877 (Berl.); *idem,* eodem loco, March

BIDENS GRANTII var. STAPFII Sherff (figs. *a–i*)

BIDENS STEPPIA (Steetz) Sherff (figs. *j–r*)

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15, 1878 (Berl.; forma foliis dissectior; nom. vulg. amor seco); *George Gardner* 2222, dry, hilly places, lane near Oeiras, northern Brazil, March, 1839 (Kew); *idem* 3851, Goyaz, Brazil, 1841 (Berl.; Boiss.; Brit.; Del.; Kew, 2 sheets; Mus. V.; Oxf.; Par.); *Ernest Gibert*, roadsides, Montevideo, Uruguay, January, 1874 (Mus. V., 2 sheets); *idem* 1*a*, eodem loco, 1858 (Kew, 2 sheets); *idem* 95, eodem loco (Kew); *Emil Hassler* 375, in ploughed fields near San Bernardino, central Paraguay, July, 1885–1895 (Boiss., 2 sheets; Brit.; Hassl.; Kew; N.Y.); *idem* 3623, in ploughed fields, San Bernardino, December, 1897–1899 (Berl.; Boiss.; Brit.; Gen.; Gray; Hassl.; Kew; Mus. V.); *idem* 11558, in region of Lake Ypacaray, Paraguay, February, 1913 (Berl.; Brit.; Hassl.; Mo.); *Guill. Herter*, Sayago, Uruguay, 1907 (Gray; Kew); *idem* 787 pro parte (Stockh.); *G. Hieronymus*, Colanchanga, Sierra Chica de Córdoba, Argentina, February, 1882 (Berl.; forma); *Hort. Bot. Genevae*, from Rio de Janeiro, Brazil, September 24, 1826 (N.Y.); *Lhotzky*, Bahia, Brazil (Berl.); *C. A. M. Lindman*, noticeable in rubbish-covered places everywhere through the state, Cruz Alta, Rio Grande do Sul, Brazil, April 20, 1893 (Stockh., 2 sheets); *idem*, dry fields, Paraguari, Paraguay, 1894 (Stockh., forma monstr.); *P. G. Lorentz* 219, Córdoba, Argentina, 1871 (Berl.); *D. Lund*, Brazil (Cop.); *John MacGillivray* 783, margin of woods, Isle of Pines, October 2, 1853 (Kew); ex *herb. John Miers*, Mendoza and Buenos Aires, Argentina (Brit.) et 705, Mendoza (Kew; nom. vulg., amores secos); *Thomas Morong* 208, Asunción, Paraguay, November 30, 1888 (Mo.; N.Y.; Phila.); *idem* 959, growing almost 3 meters high, Pilcomaya River, Paraguay, 1888–1890 (Gray; Mo.; Phila.); *C. Niederlein* 95, Concepción del Uruguay, Argentina, April 30, 1880 (Berl.); *L. R. Parodi* 8133, San Vincente, Prov. Buenos Aires, Argentina, April 14, 1927 (Gray); *Perrot*, along the Cuyabá River, Mattogrosso, Brazil, April 22, 1899 (Berl., 3 sheets; usque ad 2 m. alta); *R. Pilger* 505 (Berl.); *Ponson*, Rio de Janeiro, Brazil, 1828 (Del., type of *Bidens quadrangularis* DC.); *Raimooser*, Paraguay (U.V., 2 sheets); *A. F. Regnell* III. 778 pro parte, in forest, Caldas, Minas Geraes, Brazil, February 23, 1869 (Stockh.); *Salzmann*, cultivated places about Bahia, Brazil, 1830 (Del., type); *F. Schickendantz* 57, Yacatula, Prov. Catamarca, Argentina, March, 1879 (Berl.; forma); *Sello*, Brazil (Berl., 2 sheets); *idem* 607, Brazil (Berl.); *Teodoro Stuckert* 9469, Burruyacú, Prov. Tucumán, Argentina, April 1, 1900 (Del., 2 sheets); *idem* 9215, Tucumán, April 6, 1900 (Del.); *idem* 13077, Burruyacú, April 20,

1903 (Del.); *Tamberlik*, western Brazil (Mus. V.); *Algernon Weddell* 3169, Paraguay, April–May, 1845 (Par., 3 sheets).

O. E. Schulz (loc. cit.) found in the herbarium of the Botanical Garden at Berlin three sheets of *Bidens* material collected by Sello (the name often spelled "Sellow" in literature), No. 607, in Brazil. These he determined as *Bidens megapotamica* Spreng., although the labels bore no data as to the locality in Brazil whence the plants came. Sprengel's description was based upon a plant collected by Sello at "Rio Grande" in "Brazil."[1] That Schulz had not seen this Rio Grande specimen is shown by his citing it "Sellow ex Sprengel." In 1923 (Bot. Gaz. 76: 91) I presented these and other facts and stated the conclusion that *Bidens megapotamica* was a species of *Thelesperma* and as such had been correctly renamed *Thelesperma megapotamicum* (Spreng.) O. Kuntze (taking precedence in *Thelesperma* over the synonym *T. Scabiosoides* Less.).

In 1926 (Bot. Gaz. 81: 252–254) I reported finding what seemed an authentic specimen of *Bidens megapotamica* Spreng. in the Delessert Herbarium and on the strength of that specimen, of the well known *Isostigma Peucedanifolium* (Spreng.) Less., made the new combination *I. megapotamicum* (Spreng.). About the same time, but too late to prevent publication of this new combination (vide Bot. Gaz. 83: 425. 1927), Dr. S. F. Blake reported finding the true type of *B. megapotamica* Spreng. in the Schultz Bipontinus Herbarium (Par.). This plant, as his photograph and observations showed, was true *Thelesperma Scabiosoides Less.* Thus the plant of the Delessert Herbarium was seen to be of spurious or at least erroneous determination, and my first reasoning, namely, that *Bidens megapotamica* Spreng. was equivalent to and took precedence over *Thelesperma Scabiosoides* Less. (thus validating the name *Thelesperma megapotamicum* [Spreng.] O. Ktze.), was proved correct.

[1] Sprengel Latinized the citation Rio Grande to read "Ad fl. magnum Amer. austr.," evidently thinking that a Rio Grande River had been meant by Sello. The name *megapotamica* would seem to emphasize this fact. A study of various specimen labels, however, shows that Sello collected many specimens either in the State of Rio Grande Do Sul or in the country just south, which, although shortly after Sello's collecting separated from Brazil under the name of Uruguay, was considered a part of Brazil when Sello collected, and may easily have been considered by him a part of the adjacent province of Rio Grande Do Sul. Thus we read (as given by Lessing, Linnaea 6: 103. 1831): "Sellow in Brasilia meridionali ad Rio Pardo Octbr. et Novbr. 1823"; ibid. 141, "In Monte Video Commerson et Sellow"; ibid. 516, "Sellow in Campis ad Rio Nigro." In this connection we may note also that DeCandolle (Prodr. 5: 634. 1836) cites for the State of Rio Grande Do Sul four species of *Thelesperma* and *Isostigma* collected by Sello and cited by Lessing merely as coming from Brazil.

This is particularly reassuring, since it enables us definitely to eliminate from consideration the trivial name *megapotamica* in the genus *Bidens*, where it had been placed erroneously by O. E. Schulz (loc. cit.), and for the one species considered here to take up the name *B. subalternans* DC.

Bidens platensis Mang. was described as a hybrid between *B. pilosa* L. (staminate) and "*B. bipinnata* L." (pistillate). A study of Miss Manganaro's text convinced me some time ago that the plant which had been assumed to be *B. bipinnata* L. was in reality *B. subalternans* var. *simulans*. Recently I was given valuable aid in the determination of *B. platensis* by Professor Angel L. Cabrera of the La Plata Museum in Argentina. In a letter he wrote to the following effect: His numerous searches in the past for the type of *B. platensis* had been fruitless. He therefore had given the type up for lost. Recently, however, he had been entrusted with the rearrangement of the Spegazzini collections for the La Plata Museum. Now, the late Miss Manganaro had been a pupil of Spegazzini, and at her death her parents sent her collections to Spegazzini. Professor Cabrera found her collections inside an old chest, in November, 1930. The herbarium was in great disorder, without labels or any other indications. There were, however, several specimens of *Bidens* that had been very carefully mounted, and these were "closely similar to the original figure of *B. platensis*." Since no other specimens in the Manganaro collection had been given such special care, Professor Cabrera concluded (without doubt rightly) that these specially mounted ones represented the type material of *B. platensis*. He lent two of the supposedly type specimens for study and they are now before me. Both are typical *B. subalternans*.

Bidens subalternans var. *β.* **simulans** Sherff,
Bot. Gaz. 88: 291. 1929.

A specie foliis plus dissectis, segmentis plerumque plus minusve linearibus, differt.

Type specimen: Collected by *Pedro Jörgensen*, No. 1785, growing erect, one meter high, Department of Andalgalá, Province of Catamarca, Argentina, October 1, 1917 (U.S.).

Distribution: With the species, but much rarer.

Specimens examined: *A. L. Cabrera* 873, La Plata, Argentina, April 18, 1929 (Field); *P. Dusén*, in cultivated places, Tlapcrussú, Paraná, Brazil, February 29, 1912 (U.S.); *idem* 9432, in grassy, shrubby places, State of Paraná, March 25, 1910 (Gray; N.Y.;

U.S.); *Guill. Herter* 787 pro parte, alt. 30 meters, in clay soil, along roads, Toledo, Dept. Canelones, Uruguay, May, 1927 (Gray); *P. Jörgensen* 1283, Dept. Andalgalá, Prov. Catamarca, Argentina, October 11, 1916 (Gray; U.S.); *idem* 1785 (type, U.S.: cotype, Gray); *Otto Kuntze*, Prov. Córdoba, Argentina, December, 1894 (N.Y.); *idem*, eodem loco (Mo.); *Regnell* III. 778 pro parte, in cultivated places, Caldas, Minas Geraes, Brazil (Stockh.); *idem* III. 778*a*, Rio Verde, Caldas (Stockh.); *S. Venturi* 121, barracks south of Buenos Aires, Argentina, April 28, 1902 (Stockh.).

At times *Bidens subalternans* is found with the leaves delicately 2–3-pinnatisect and the segments linear, even narrowly so. For a number of years, when making herbarium determinations, I included such forms under the species proper without distinction. Only more recently have I distinguished them as var. *simulans*. In some cases they suggest *B. bipinnata* L. so strongly as to create confusion. In other cases they display a slight approach to *B. exigua* Sherff.

Bidens subalternans var. γ. **unipinnata** Sherff,
Bot. Gaz. 88: 292. 1929.

A specie foliis pinnatim 3–5-partitis foliolis lanceolatis vel ovato-lanceolatis differt.

Type specimen: Collected by *Emil Hassler*, No. 11558, in the region of Lake Ypacaray, central Paraguay, February, 1913 (Gray).

Distribution: Argentina, Paraguay, and Brazil.

Specimens examined: *Beyrich*, in rubbish-strewn places near Rio de Janeiro, Brazil (Stockh.); *Blanchet* 816, about Bahia, Brazil, 1831 (N.Y.); *R. E. Fries*, Santa Bárbara, Prov. Salta, Argentina, July, 1901 (Stockh.); *Hassler* 11558 (Gray, type); *P. Jörgensen* 1080, Comaú, Andalgalá, Prov. Catamarca, Argentina, November 11, 1916 (Mo.); *idem* 2041, Terr. Chaco, Argentina (Mo.); *G. A. Malme* 1410*B*, in rubbish-strewn places, Santa Anna da Chapada, Matto Grosso, Brazil, February 20, 1894 (Stockh.); *Martius*, herb-grown places along San Francisco River near Joazeiro, Bahia, Brazil, March–April (Kew); *L. R. Parodi* 7787, adventive in cultivations, Lanugasta, Chilecito, Prov. La Rioja, Argentina, January 31, 1927 (Gray).

Occasionally a South American specimen of *Bidens* is found with the general aspect of *B. pilosa* L., but with the fruiting heads as in the closely related *B. subalternans*. A close inspection shows that the only difference from typical *B. subalternans* is in the once-pinnate (instead of twice-pinnate) leaves.

BIDENS RUFOVENOSA Sherff (figs. *a–i*)
BIDENS LEPTOLEPIS Sherff (figs. *j–p*)

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EXPLANATION OF PLATE CX

Bidens subalternans: a (lower), *b* (upper), portions of flowering and fruiting specimen, ×0.57; *c*, exterior involucral bract, ×4.53; *d*, interior involucral bract, ×4.53; *e*, ray corolla, ×4.53; *f*, palea, ×4.53; *g*, disc floret, ×4.53; *h* (outer), *i* (inner), achenes, ×4.53; all from *Morong* 959, in Hb. Gray.

134. **Bidens domingensis** O. E. Schulz in Urban, Symb. Antill. 7: 429. 1912. Plate CXI.

Herba erecta, annua, ramosa, 3–5 dm. alta, caule quadrangulato subglabroque. Folia petiolata petiolis tenuibus ciliatisque usque ad 2.5 cm. longis, petiolo adjecto circ. 5–7 cm. longa, simpliciter pinnata, bijuga; foliolis membranaceis, ciliatis, utrinque pilis articulatis crispis disperse pilosis; terminali oblongo-ovato, apice acuminato, ad basim decurrenti, utrinque profunde 3–6-serrato, circ. 2–3 cm. longo et 1–1.3 cm. lato; lateralibus ovatis, superioribus plus minusve sessilibus, inferioribus breviter petiolulatis; folia suprema foliolis angustiora et oblonga. Capitula pauca tenuiter pedunculata pedunculis 6–15 cm. longis, subradiata, pansa ad anthesin 4–8 mm. alta et 4–9 mm. lata. Involucri bracteae exteriores circ. 8, lineares, ciliatae, circ. 4.5 mm. longae, quam interiores lanceolatae paulo breviores. Flores ligulati circ. 5, albidi, non perspicui; flores tubulosi circ. 20. Achaenia linearia, subattenuata, nigrescentia, supra pilosa, subtetragona, corpore 1–1.6 cm. longa, apice bi- vel rarius triaristata aristis retrorsum hamosis 2.5–3 mm. longis.

Type specimen: Collected by *Miguel Fuertes*, No. 1324, at altitude of 1,300 meters, La Ho near Rincón, Province of Barahona, Santo Domingo, October, 1911 (Berl.).

Distribution: Island of Santo Domingo, West Indies.

Specimens examined: *Fuertes* 1320, alt. 1,300 meters, near Rincón, Prov. Barahona, October, 1911 (N.Y.); *idem* 1324 (type, Berl.: cotypes, Del., 2 sheets; Mus. V.).

A species meriting further study. Plants collected by Raunkiaer[1] appear to be *B. pilosa* and yet have capitula not essentially different from those of the Fuertes plants of *B. domingensis*. (Cf. etiam *Fendleri* 695 pro parte sub *B. pilosa* var. *radiata*.)

EXPLANATION OF PLATE CXI

Bidens domingensis: a, b, lower and upper parts of flowering and fruiting plant, ×0.7; *c*, exterior involucral bract, ×3.52; *d*, interior

[1] *C. Raunkiaer*, La Cumbre, Haiti, April 8, 1906 (Cop.); *idem* 1005, Puerto Plata, Haiti, April 5, 1906 (Cop.).

involucral bract, ×3.52; *e*, ray floret, ×2.11; *f*, palea, ×3.52; *g*, disc floret, ×4.22; *h* (outer), *i* (inner), achenes, ×2.11; *a–d*, *f–i*, from type; *e*, from *Fuertes* 1320, in Hb. N. Y.

135. **Bidens Malmei** Sherff, Bot. Gaz. 89: 364. 1930. Pl. CXII.

Herba annua, erecta, caule acriter tetragona, supra ramosa, 0.4–1 m. alta. Folia tenuiter petiolata petiolis usque ad ±4 cm. longis, petiolo adjecto 4–10 cm. longa, minutissime sparsimque pubescentia, ciliata, membranacea, primaria mediana subbipinnata, foliolis lateralibus 2–3 jugis, basalibus rursus 2–3-partitis, aliis indivisis, omnibus circumambitu ovatis circ. 2.5–3.5 cm. longis, crenato-dentatis, dentibus (saepe duplicibus) unico latere circ. 6–12; superiora minora, bipinnata vel etiam tripinnatisecta, segmentis plus minusve ovato-oblongis. Capitula laxe corymboideo-paniculata, tenuiter pedunculata pedunculis 5–17 cm. longis, subradiata, pansa ad anthesin circ. 6 mm. alta et aequaliter lata. Involucri basaliter hispidi bracteae exteriores 6–8, lineares, hispidae, apice subacutae, sub apice rarissime subdilatatae, 3–4 mm. longae; interiores linearilanceolatae, 5–7 mm. longae. Flores ligulati albidi rudimentarii, ligula ipsa tantum circ. 1–1.5 mm. longi plus minusve obcordati atque apice paucidentati. Achaenia linearia, nigra, tetragona, facie unaquaque 2-sulcata, glabra vel paulo erecto-setosa, corpore 7–11 mm. longa et 0.5–0.7 mm. lata, apice exteriora 2–3- alia 4-aristata, aristis stramineis retrorsum hamosis 2–3 mm. longis.

Type specimen: Collected by *Gustaf O. A. Malme*, No. 1456, near Menino Denso, Porto Alegre, State of Rio Grande do Sul, Brazil, March 3, 1902 (Stockh., 2 sheets).

Distribution: State of Rio Grande do Sul, Brazil.

Specimens examined: *Malme* 1456 (2 type sheets, Stockh.).

Allied with *Bidens bipinnata* L., *B. duranginensis* Sherff, *B. Gardneri* Baker, and *B. subalternans* DC.

EXPLANATION OF PLATE CXII

Bidens Malmei: a, flowering and fruiting specimen, ×0.62; *b*, exterior involucral bract, ×4.92; *c*, interior involucral bract, ×4.92; *d*, (rudimentary) ray corolla, ×4.92; *e*, palea, ×4.92; *f*, disc floret, ×4.92; *g*, achene, ×3.69; all from 1st type sheet.

136. **Bidens Cynapiifolia** H.B.K. Nov. Gen. et Sp. Pl. 4: 185 (235). 1820. Pl. CXIII.

Bidens Cynapifolia H.B.K. ex Heynhold, Nomencl. 121. 1840 (sphalm).

BIDENS ASPERATA (Hutch. & Dalz.) Sherff

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Bidens bipinnata var. *Cynapiifolia* (H.B.K.) Gómez, Ann. Hist. Nat. Madrid 19: 275. 1890.

Caulis a basi ramosissimus, ramis perspicue tenuibus, foliis plerumque pinnatis inferioribus circ. 3.5 cm. longis, foliolo terminali circ. 1 cm. longo saepe integro.....var. γ. *tenuis*.

Habitus diversa, foliis plerumque bipinnatis inferioribus majoribus.

Achaenia plerumque paulo recurvato-falcata, nonnulla (2–4 marginalia) dense hirta.....*B. Cynapiifolia* sensu stricto.

Achaenia recta vel subrecta, omnia glaberrima.

var. β. *portoricensis*.

Herba annua, erecta; caule ramoso, tetragono, glabro vel nodis piloso, 0.3–1.2 (rarius –2) m. alto. Folia petiolata petiolis 1.5–6 cm. longis, petiolo adjecto 4–15 cm. longa, bipinnata; foliolis valde membranaceis, ciliatis, utrinque ad nervos sparsim adpresseque pilosis, his vel suis lobis deltoideo-ovatis vel lanceolatis, serratis. Capitula obscurissime radiata, ad anthesin minuta (5–7 mm. lata et 4–6 mm. alta), floribus ±25, pedunculis tenuibus 2–9 (–15) cm. longis. Involucri basis glanduloso-hispida; bracteis exterioribus circ. 7, linearibus, acutis, fere glabris, 4–6 (–7) mm. longis, quam interioribus paulo brevioribus. Flores ligulati 4 vel 5, ligula oblongo-elliptici, pallide flavi vel albidi, apice integri vel irregulariter denticulato-incisi, 5–7.5 mm. longi. Achaenia linearia, tetragona, olivaceo-brunnea, plerumque paulum recurvato-falcata, 4- (rariter 5- vel 6-) aristata aristis retrorsum hamosis et 1–3.5 mm. longis, corpore 7–14 (–17) mm. longa, marginalia 2–4 brevia pilis brevibus erecto-patulis dense hirta, reliqua glabrata.

Type specimen: Collected by *Alexander Humboldt* and *Aimé Bonpland* on the Island of Cuba,[1] in April, 1799–1804 (Par.).

Distribution: Widely distributed throughout the West Indies; in State of Yucatan, Mexico, and throughout northern South America to central Peru and the states of Matto Grosso and Ceará, Brazil; has been collected (*T. Thomson*) also in northwestern Himalaya, British East India, where doubtless adventive; recently established in the Hawaiian Islands.

Specimens examined:[2] *Ed. André* 151, La Guayra, Venezuela, November 25, 1875 (Field; N.Y.); *anon.*, St. Croix (Cop.); *Charles*

[1] The type sheet gives Havana for the locality, but Bonpland's private duplicate sheet gives "Guanavacoa" (Guanabacoa; across the small bay from Havana) and so does Kunth's original description.

[2] Many of these specimens were listed in the manuscript before it was decided to maintain any varieties of *B. Cynapiifolia*, hence possibly a very few are included which belong to var. *portoricensis* or var. *tenuis*.

Belanger 179, St. Pierre, Martinique, March, 1853 (Del.); *idem* 522, eodem loco, 1860 (Par.); *P. E. Benzon*, St. Croix (Cop.); *idem*, West Indies, 1820 (Cop.); *Blauner* 86, Aguas Claras, Puerto Rico, 1853 (Del.); *L. J. K. Brace* 385, Bahamas, April–June, 1879 (N.Y.); *N. L. Britton* 1612, waste places, Bluefields and vicinity, Jamaica, September 22, 1907 (N.Y.); *idem* 2972, roadside, Constant Spring, vicinity of Kingston, Jamaica, August 29, 1908 (N.Y.); *idem & uxor & J. A. Shafer* 116, Playa, vicinity of Matanzas, Cuba, March 12, 1903 (Carn.; N.Y.); *N. L. Britton & J. F. Cowell* 29, roadside, St. Croix, September 5, 1901 (N.Y.); *iidem & Stewardson Brown* 4996, waste grounds, Cayo Muertos, Puerto Rico, March 9–12, 1915 (N.Y.); *N. L. Britton & John Shafer* 752, banks, Isl. Tortola, February 13–17, 1913 (N.Y.); *iidem* 3117, rocky hill, Mt. Pleasant, Curaçao, March 20–27, 1913 (N.Y.); *N. L. Britton & W. M. Wheeler* 129, waste places, Isl. Culebra, Puerto Rico, March 3–12, 1906 (N.Y.); *N. L. Britton & Percy Wilson* 469, hills south of Matanzas, Cuba, September 10, 1903 (N.Y.); *W. E. Broadway*, open places in the lowlands, St. George's, Grenada, November–December, 1904 (Gray; N.Y.) and March, 1905 (Del.); *E. M. Bryant* 69, windward coast, Dominica, 1905 (Kew); *Rob. Combs* 152, not uncommon in fertile, shaded places, Cieneguita, Distr. Cienfuegos, Prov. Santa Clara, Cuba, June 17, 1895 (Berl.; Field; Gray; Kew; Mo.); *J. S. De La Cruz* 1839, Mora Landing, Moruka River, Pomeroon Distr., British Guiana, August 21–23, 1922 (Gray; N.Y.); *idem* 3809, Waini River, Northwest Distr., British Guiana, April 3–18, 1923 (Phila.); ex *Herb. Estación Central Agronómica* (Cuba) 1349, Laguna de Castellano, vicinity of Santiago de las Vegas, Prov. La Habana, Cuba (Field); *A. H. Curtiss*, in tobacco bed, Nueva Gerona, Isle of Pines, January, 1904 (N.Y.); *O. Debeaux*, Fort de France, Martinique, March 29, 1897 (Par.); *Otto Degener* 3777, between Waiohinu and Kaalualu, Isl. Hawaii, September 9, 1929 (Field; U.S.); *idem* 3778, eodem loco, September 10, 1929 (Field); *idem* 3780, arid cliff, South Point above Pukawaakauhi, Isl. Hawaii, September 17, 1929 (Field); *idem* 3781, arid pasture, Keei, Isl. Hawaii, September 21, 1929 (Field); *idem & Herbert Kai* 3779, dry, open forest, near Kaalualu, Isl. Hawaii, September 13, 1929 (Field); *Père Duss* 19, in fields, Antigua, December, 1902 (N.Y.); *idem* 468, Basse-Terre, Guadeloupe, 1893 (Par.); *idem* 1444, abundant at St. Pierre and Robert, Martinique, 1882 (N.Y.); *idem* 2504, road from Basse-Terre, Guadeloupe, 1892 (Field); *Heinrich Franz Alexander Eggers*, Isl. St. Croix, in 1874 (Cop.); *idem*, in ruderal places, St. Thomas, February 8, 1877 (Gray) and

BIDENS URCEOLATA DeWild. (figs. *a–g*)
BIDENS RUBRA DeWild. (figs. *h–o*)

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July, 1881 (N.Y.); *idem* 45, eodem loco, December, 1886 (Cop.); *idem* 204, eodem loco, September, 1880 (Gray); *idem* 208, alt. 330 meters, Signal Hill, eodem loco, December, 1880 (Mus. V.; U.V.); *idem* 454, St. Thomas (Par.); *idem* 4601, Guantánamo, Cuba, February, 1889 (Kew); *idem* 5499, Gomez Bay, Tobago, October, 1889 (N.Y.); *Carl Ehrenberg* 7, St. Thomas (Berl., 2 sheets); *W. R. Elliott* 117, Grenada, 1888 (Field); *A. Fendler* 460, Trinidad, 1877–1880 (Brit.); *Emanuel Friedrichsthal* 38 and 110, Santo Tomás, Guatemala, 1841 (Mus. V.) and 313 (Mus. V., 2 sheets); *Fuertes* 322, near Barahona, Santo Domingo (Del., 3 sheets; N.Y.; Par.); *Gabriel*, French Guiana, 1802 (Del.); *George Gardner* 1742, Ceará, 1839 (Kew); *G. F. Gaumer* 940, Yucatan, Mexico (N.Y.; U.S.); *idem* 2498, Izamal, Yucatan (Kew); *Gillberg* 167, Cartagena, Colombia, 1826 (Berl.); *G. P. Goll* 742, Jagney, Coamo, Puerto Rico, November 23, 1899 (U.S.); *Ludwig Hahn* 383, between St. Pierre and Le Fond St. Denis, Martinique, December, 1867 (Kew); *A. A. Heller* 6196, Adjuntas Road, 8 miles from Ponce, Puerto Rico, December 4, 1902 (Del.; Gray; Mo.; Phila.); *J. Hennecart*, Isl. Santo Domingo, March 11, 1827 (Par.); *A. S. Hitchcock*, Nassau, New Providence, November, 1890 (Mo.); *idem*, Constant Springs, Jamaica, December 10, 1890 (Mo.); *idem*, Grand Cayman, January 17, 1891 (Mo.); *I. Hubo* 30, Pará, Brazil, August, 1895 (Boiss.); *Humboldt & Bonpland*, Guanabacoa, Cuba (type and cotype, Par.); *P. E. Isert*, St. Croix, 1787 (Cop.); *V. Jacquemont*, wet places, Marquisant, near Port au Prince, Haiti, March 11, 1827 (Kew); *Jenman* 4643, Bartica Grove, British Guiana, November, 1888 (Brit.); *idem* 5383, coast lands, British Guiana, June, 1889 (N.Y.; U.S.); *J. R. Johnston* 709, Mameyes, Puerto Rico, December 5, 1912 (N.Y.); *E. P. Killip & A. C. Smith* 14807, alt. 100 meters, clearing, Puerto Wilches and vicinity, Dept. Santander, Colombia, November 28–December 2, 1926 (U.S.); *Krebs*, St. Thomas, October, 1846 (Cop.); *Otto Kuntze*, Trinidad, April, 1874 (Field, sub nom. *B. pilosa* L. *subdiscoidea* f. *decomposita*); *idem* 533, Guama, Puerto Rico, March, 1874 (N.Y.); *McLadyer*, Jamaica (Kew); *L. A. Lee*, Port Castries, St. Lucia, December 1, 1887 (U.S.); *Leon* 1399, Prov. Pinar del Río, Cuba, August 12, 1909 (N.Y.); *E. C. Leonard* 3455, Port au Prince, Haiti, April 1–2, 1920 (Phila.); *Leprieur*, French Guiana (Del.); *idem*, eodem loco, 1835 (Del.; Par.); *Meyen*, Lima, Peru, May, 1831 (Berl.); *G. O. A. Malme* 3166, Cujabá, Matto Grosso, April 29, 1903 (Stockh.); *idem* 3166*a*, eodem loco, May 3, 1903 (Stockh.); *C. F. Millspaugh* 501, Charlotte Amalie, St. Thomas, January 17–18 (Field); *S. L. Moore* 581, Santa

Cruz, Matto Grosso,[1] November, 1891 (Brit.); *Otto* 428, Colombia (Kew); *A. C. Persaud* 112, sandy and cultivated places, Georgetown, British Guiana, February, 1923 (Field); *H. Pittier* 4839, in savannas near sea level, Aguadulce, Prov. Coclé, Panama, December 3–6, 1911 (U.S.); *Poiteau*, Isl. Santo Domingo, 1802 (Del.); *C. Raunkiaer* 1004, Puerto Plata, Isl. Santo Domingo, April 5, 1906 (Cop.); *L. C. Richard*, French Guiana (Par., sub nom. *Bidente multipartita*); *A. E. Ricksecker* 13, Christiansted (Bassin), St. Croix, October 23, 1895 (Mo.; N.Y.); *Mrs. J. J. Ricksecker* 129, eodem loco, February 16, 1897 (Mo.; U.S.); *J. von Rohr*, St. Croix (Brit.); *H. H. Rusby & F. W. Pennell* 147, alt. 350–400 meters, dry, open loam, Girardot, Dept. Cundinamarca, Colombia, July 19, 1917 (N.Y.); *Ramón De La Sagra*, about Havana, Cuba, 1825 (Del.); *Carlos Schunke* 1425, alt. 1,000 meters, Chanchamayo Valley, Dept. Junín, Peru, April, 1929 (Field); *J. A. Shafer*, Prov. La Habana, Cuba, April 2, 1903 (Carn.); *idem* 2439, waste places, Isabel Segunda, Isl. Vieques, Puerto Rico, January 24–27, 1914 (N.Y.); *idem* 4334, Lower Valley of Río Miel, Oriente, Cuba, March 17, 1910 (Field); *idem* 12071, roadside, Spiritus, Prov. Santa Clara, Cuba, February 15–24, 1912 (N.Y.); *P. Sintenis* 27, mountain slopes, Mesa, Mayagüez, Puerto Rico, October 20, 1884 (Kew; Mo.; Mun.); *idem* 1978, on slopes, Coamo, Aibonito, etc., Puerto Rico, November 4, 1885 (Berl., 2 sheets); *idem* 4226, among coffee bushes, Mt. Galsa, Adjuntas, Puerto Rico, April 28, 1886 (Del.); *idem* 4651, on slopes at Yunco, Adjuntas, June 24, 1886 (Mo.; Par.; U.V.); *idem* 5072, at La Tandura, Tabucoa, Puerto Rico, September 18, 1886 (Brit.; Del.; Carn.; U.S.); *H. H. Smith* 600, common in clearings and dry woods, alt. 75 meters, Santa Marta, Colombia, November, 1898–1901 (Berl.; Brit.; Carn.; Del.; Kew; Mo.; N.Y.; Phila.); *idem* 601, boggy, open land, south of Mamatoca, Santa Marta, Colombia (N.Y.); *idem & G. W. Smith* 305, alt. up to 300 meters, St. Vincent, West Indies (Kew); *R. Spruce* 651, Santarem, State of Pará, Brazil, April, 1850 (Mun.) and 829 (Boiss.; Brit.; Del., 2 sheets; Kew, 2 sheets; Petrop.; Webb); *F. L. Stevens* 6359, Isl. Mona, December 20–21, 1913 (N.Y.); *Norman Taylor* 23, Santiago, Cuba, August 27, 1906 (N.Y.); *T. Thomson*, alt. 1,500–2,100 meters, northwestern Himalaya, India (Mus. V.); *J. W. H. Traill* 492, Manaos, Amazonas, Brazil, June 12, 1874 (Kew); *Triana* 1371, alt. 600 meters, Río Apulo, Prov. Bogotá, Colombia (Par.); *H. Von Türckheim* 3646, alt. 300 meters, among bushes, near Maniel de Ocoa, Isl. Santo Domingo, October, 1910 (Del.; Kew; Mun.;

[1] Name of state supplied from Trans. Linn. Soc. Lond. ser. 2. 4, pt. 3: 270. 1895.

BIDENS TAITENSIS Sherff

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N.Y.); *Weigelt*, Surinam (Del.); *Llewelyn Williams* 1249, Santa Ana on the Upper Río Nanay, Dept. Loreto, Peru, July 7, 1929 (Field); *idem* 2601, La Victoria on the Amazon River, Dept. Loreto, August 20, 1929 (Field); *Wilson* 255, Jamaica, 1857 (Kew); *Charles Wright* 315, eastern Cuba, 1856–1857 (Gray; Kew); *Wullschlägel* 300, along roads and among bushes, Paramaribo, Surinam (Mus. V.); *H. Wydler* 101, St. Thomas, 1827 (Del., 2 sheets).

Bidens Cynapiifolia var. β. **portoricensis** (Spreng. ex DC.) O. E. Schulz in Urban, Symb. Antill. 7: 131. 1911.

Bidens portoricensis Spreng. ex DC. Prodr. 5: 601. 1836.

Capitula floribus radialibus deficientibus discoidea, raro radiata. Omnia achaenia glaberrima, quadriaristata; corpore saepius nigro ac recto vel subrecto, aristis saepius stramineis.

Type specimen: Collected by *Charles Joseph Bertero* in Puerto Rico and sent to DeCandolle (Del.).

Distribution: With the species but much rarer.

Specimens examined:[1] *Bertero*, Puerto Rico (type, Del.); *B. E. Dahlgren & E. Sella* 479, Belem, State of Pará, Brazil, March–May, 1929 (Field); *iidem* 726, eodem loco et tempore (Field); *G. O. A. Malme* 3166*b*, subruderal place, Santa Anna do Chapada, Matto Grosso, Brazil, May 26, 1903 (Stockh.); *Passarge* 23, Rosalía, eastern Venezuela, 1901 (Berl.); *P. Sagot* 351, Iles du Salut, French Guiana, 1854 (Boiss.; Del.; Mus. V., 2 sheets; Par., 2 sheets); *idem* (similiter) 351, Karouany, French Guiana, 1858 (Brit.; Kew; nom. vulg., Persil diable); *R. Schomburgk* 455 p.p., Berbice, British Guiana, 1837 (Berl.; Brit.); *P. Sintenis* 3787, in forests at La Plata, Guanica, Puerto Rico, February 17, 1886 (Berl.); *Norman Taylor* 388, edge of road, La Romana, Prov. of Seibo, Santo Domingo, December 1–3, 1909 (N.Y.); *E. Ule* 5155, edge of forest, Bom Fim, Amazonas, Brazil, November, 1900 (Berl.).

Bidens Cynapiifolia var γ. **tenuis** O. E. Schulz in Urban, Symb. Antill. 7: 131. 1911.

Caulis a basi ramosissimus; ramis tenuibus. Folia minora, inferiora petiolis circ. 1 cm. longis exclusis circ. 2.5 cm. longa (foliolo terminali circ. 1 cm. longo, saepe integro, jugis inferioribus brevissime petiolulatis, foliolis parce crenatis); folia superiora (petiolo

[1] See footnote under "Specimens examined" for the species proper. The few examples listed have been selected partly with the aid of memoranda as to O. E. Schulz's determinations in the Berlin Herbarium.

adjecto) 1.5–2 cm. longa, simpliciter pinnata, petiolo circ. 0.5 cm. longo. Capitula eis plantae typicae aequalia.

Type specimen: Collected by *Fr. Xavier*, on hills near Jacmel, Haiti, December (Berl.).

Distribution: Haiti and Puerto Rico and perhaps elsewhere in the range of the species proper.

Specimens examined: *P. Sintenis* 27*C*, bank of river, Fajardo, Puerto Rico, April 21, 1885 (Boiss.); *idem* 3591, among bushes at Montalba, Guanica, Puerto Rico, February 2, 1886 (Berl.; Field; Mus. V.).

Apparently a mere state of the species itself.

EXPLANATION OF PLATE CXIII

Bidens Cynapiifolia: a, portion of fruiting specimen, ×0.85; *b* (upper), *c* (lower), leaves, ×0.85; *d*, exterior involucral bract, ×6.82; *e*, interior involucral bract, ×6.82; *f*, palea, ×6.82; *g*, disc floret, ×6.82; *h* (outer), *i* (inner), achenes, ×3.41; *a*, *b*, mainly from type; *c–i*, from *Duss* 1444, in Hb. N.Y.

137. **Bidens riparia** H.B.K. Nov. Gen. et Sp. 4: 185 (236). 1820. Pl. CXIV, figs. *i–p*.

Bidens Ambrosioides Willd. ex O. E. Schulz in Urban, Symb. Antill. 7: 132. 1911.

Folia tripartita.....var. *β. refracta.*
Folia bipinnata.....*B. riparia* sensu stricto.

Herba annua, erecta, 3–5 dm. alta; caule tetragono, glabro, ramoso. Folia petiolata petiolis tenuibus 1–5 cm. longis, petiolo adjecto 0.4–1.2 cm. longa, membranacea, supra pilosiuscula, subtus glabra, margine scabro-ciliata, bipinnata, segmentis ovatis vel lanceolatis, plus minusve inciso-lobatis et -dentatis, terminali apicaliter acuminato-angustato. Capitula pauca, inconspicue radiata, terminalia, tenuiter pedunculata pedunculis 0.2–1.5 dm. longis, ad anthesin (bracteis exterioribus non inclusis) 5–8 mm. lata et 4–6 mm. alta. Involucrum basi piloso-hispidum; bracteis exterioribus 7–13, anguste linearibus, patentibus reflexisve, glabris vel interdum remotissime hispido-ciliatis, apice acutis, 6–10 mm. longis; interioribus linearilanceolatis, 4–7 mm. longis. Flores ligulati deficientes vel 4 vel 5, minuti (3–5 mm. longi), flavido-albi, ligula elliptico-ovati vel oblongo-elliptici, apice integri vel denticulati. Achaenia tetragona, linearia, recurvata, brunnea vel olivaceo-brunnea, 3- vel 4-(vel etiam 5-) aristata aristis retrorsum hamosis, una duabusve erectis, reliquis

BIDENS FISCHERI (O. Hoffm.) Sherff (figs. *a–h*)
BIDENS SCHIMPERI Schz. Bip. *ex* Walp. (figs. *i–q*)

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reflexis, 2–3.5 mm. longis; interiora demum glabra vel apicem versus hispida, supra saepe plus minusve attenuata, corpore 1–1.5 cm. longa; nonnulla exteriora[1] dense pilosiusculo-hispida, breviora, crassiora.

Type specimen: Collected by *Alexander Humboldt* and *Aimé Bonpland*, in very warm places on the bank of the Magdalena River near Badillas, Colombia, May, 1801 (Par.).

Distribution: Southern Mexico southward through Guatemala and Costa Rica to northern Peru and central Brazil.

Specimens examined: *N. J. Andersson* 66, Puna, Prov. Jujuy, Argentina, 1852 (Stockh., 2 sheets); *Bernoulli & Cario* 1384, Granados, Guatemala, November, 1877 (Berl.; Kew); *Burchell* 8805, State of Pará, Brazil (Gray; Kew; Par.; Petrop.; Webb); *D. da Rocha* 3, Bahia, Brazil (Field); *O. de Carvalho* 5, Vianna, Maranhão, Brazil, July 23, 1919 (Field); *George Gardner* 3851, Goyaz, Brazil (Mus. V.; Par.; Webb); *G. F. Gaumer* 2498, Izamal, Yucatan, Mexico (Berl., 2 sheets); *Humboldt & Bonpland*, bank of Magdalena River near Badillas, Colombia, May, 1801 (type and cotype, Par.); *E. Langlassé* 414, alt. 50 meters, La Puerta, southern Mexico, October 4, 1898 (Berl.; Gray; Kew; U.S.); *Alb. Löfgren* 495, Ceará, Brazil (Stockh.); *Martius*, in cultivated and rubbish-covered places along Itapicurú River near Caxias, Maranhão, Brazil, May (Mun., 2 sheets); *Ridley, Lea, & Ramage*, suburbs of Pernambuco, Brazil, July 13, 1887 (Brit.); *A. de Saint Hilaire* 1199, Goyaz, Brazil, 1816–1821 (Par.); *A. Tonduz* 13618, roadsides at Nicoya, Costa Rica, December, 1899 (Berl., 2 sheets; Brit.; Del., 2 sheets; Kew; U.S.); *A. Weberbauer* 5975, alt. 200–300 meters, western slopes of Andes, Terrán (east-southeast from Piura), Peru, March 27, 1912 (Berl.); *Llewelyn Williams* 7917, alt. 120 meters, Iquitos, Dept. Loreto, Peru, March–April, 1930 (Field).

Humboldt sent some of the type material of *Bidens riparia* to Willdenow, who labeled it *B. Ambrosioides*. From the Willdenow Herbarium (Berl.) Schultz Bipontinus obtained a leaf and some achenes, which are preserved in a packet in his private herbarium (Par.) and are likewise labeled *B. Ambrosioides* ("Willd. herb. no. 15031 fol. 1 . . . "). Kunth's name *B. riparia* takes precedence over Willdenow's, having received earlier publication.

Bidens riparia var. *β.* **refracta** (Brandeg.) O. E. Schulz in Urban, Symb. Antill. 7: 132. 1911. Pl. CXIV, figs. *a–h*.

Bidens refracta Brandeg. Zoë 1: 310. 1890.

[1] Kunthii descriptio "*interiora*" dixit per errorem.

Usque ad 9 dm. alta. Folia tripartita; foliolis ovatis vel ovato-lanceolatis, serratis, terminali acuminato majoreque. Achaenia extima perpauca dense pilosiusculo-hispida crassioraque, 0.8–1.2 cm. longa. Achaeniorum interiorum longiorum aristae 1.5–5 mm. longae.

Type specimen: Collected by *Townsend S. Brandegee*, No. 319, in the shade of trees and bushes, near Miraflores, Lower (Baja) California, October 13, 1890 (Calif.).

Distribution: Lower California and State of Sinaloa, Mexico, southward through Central America to Galapagos Islands, Peru, Colombia, and British Guiana to east central Brazil (State of Bahia).

Specimens examined: *George Barclay* 2643, loam soil, arid banks, Gulf of Fonseca, Central America, November, 1830 (Brit.); *idem*, Huamantanga, Peru (Gray); *Brandegee* 319 (type, Gray: cotype, Phila.); *idem*, eodem loco, September 27, 1899 (Gray); *idem*, common at Cofradía (vicinity of Culiacán), Sinaloa, October 20, 1904 (Calif.); *Padre Cornelio* 24, Venezuela (N.Y.); *C. C. Deam* 242, alt. 186 meters, Zacapa, Guatemala, January, 1905 (Gray); *Placide Duchassaing*, Panama, 1851 (Par., 2 sheets); *George Gardner* 878, Bahia, Brazil, 1837–1839 (Brit.; Del., 2 sheets; Kew; Mus.V.); *G. F. Gaumer* 451 p.p., Yucatan, Mexico, 1895 (Berl.; Boiss.; U.S.); *idem* 2499, Izamal, Yucatan (Field); *idem* 2504, eodem loco (Field); *Oscar Haught F*139, on the Tablazo, northeast of Talara, Dept. Piura, Peru, March 29, 1929 (Field); *William Heuston*,[1] 1730 (Brit.); *Heyde & Lux* 4208 pro parte, alt. 1,200 meters, Santa Rosa, Dept. Santa Rosa, Guatemala, November, 1892 (Field); *Jenman* 5499, British Guiana, October, 1889 (U.S.; forma foliolis inferioribus 3–4-partita); *E. Langlassé* 523, alt. 250 meters, Chaveta, southern Mexico, October 26, 1898 (Berl.; Gray; Kew); *C. L. Lundell* 899, common weed 1 meter tall, Tuxpeña, Campeche, Mexico, November 4, 1931 (Stanf.); *Ynes Mexia* 189, alt. 240 meters, deciduous woods, foothills, La Noria, Sinaloa, Mexico, October 8, 1925 (Mo.); *Edward Palmer* 205, Acapulco, Guerrero, Mexico, October, 1894–March, 1895 (Gray); *idem* 923, Manzanillo, Colima, Mexico, December, 1890 (Berl.; Brit.; Gray); *idem* 1631, Lodiego, Mexico, October 9–25, 1891 (Field); *G. H. Pring* 10, alt. 180 meters, bank of Magdalena River, Dept. Antioquia, Colombia, April 25, 1923 (Mo.); *A. E. Salazar* 387, Rancho del Agua Fría, San Ignacio, Sinaloa, Mexico, June 11, 1918 (U.S.; nom. vulg., tomatillo); *W. Schaffner*, near

[1] Labeled "*Heustin* [sic], Jamaica, 1730." Neither the variety nor the species proper is known to occur in Jamaica. Concerning the inaccuracy of Heuston labels reading thus, see Millspaugh and Sherff, Rev. N. Amer. Sp. *Xanthium*, Field Mus. Bot. 4: 21. 1919.

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Culiacán, Sinaloa, Mexico, October (Gray; Mus. V.); *H. Schenck* 4095, State of Pernambuco, Brazil, June–September, 1887 (Berl.); *Berthold Seemann*, Panama (Brit.); *C. L. Smith*, Isl. Ometepe, Nicaragua, January, 1893 (Gray); *R. E. Snodgrass & E. Heller* 92, Iguana Cove, Albemarle Isl., Galapagos Isls., March 4, 1899 (Gray; Stanf.); *iidem* 316, alt. 600 meters, South Narborough Isl., Galapagos Isls., April, 1899 (Gray; Stanf.); *iidem* 338, eodem loco, abundant, March, 1899 (Gray); *iidem* 380, most abundant, growing in lava soil everywhere in shade of bushes and trees, James Bay, James Isl., Galapagos Isls., April, 1899 (Gray; Stanf.); *iidem* 420, Charles Isl., Galapagos Isls., May, 1899 (Stanf.); *iidem* 732, Hood Isl., Galapagos Isls., May, 1899 (Gray; Stanf.); *Alban Stewart* 743, alt. 60 meters, open places, abundant, Iguana Cove, Albemarle Isl., Galapagos Isls., 1905–1906 (Brit.; Mo.).

Brandegee's original description, like several others of his *Bidens* descriptions, was carelessly drawn. The exterior involucral bracts are linear, not "linear-lanceolate." The terminal leaflet is larger, not "much smaller" than the lateral ones. The achenes are almost uniformly shorter than he says, very few being "20–25 mm." long.

O. E. Schulz (loc. cit.), in reducing this form to varietal rank under *B. riparia*, differentiated the two forms on the basis of fruit characters, but an examination of many specimens of each form shows that the only genuine difference is in the foliage. *B. refracta* Brandeg. has tripartite leaves while *B. riparia* H.B.K. has bipinnate or tripinnatisect leaves. This difference Schulz seems to have overlooked. Indeed, he even refers to *B. refracta*, *Tonduz* 13618, a plant identical in foliage and other parts with the type and Bonpland cotype of *B. riparia*.[1]

Several years ago, on having examined 22 collections of the *refracta* form and failed to find more than one approach in foliage to that of *B. riparia*, I concluded (Bot. Gaz. 64: 35. 1917) that "the probabilities are strong that *B. refracta* and *B. riparia* are entirely distinct species." Since then, I have seen several other foliage intergradations. Furthermore, we have the important consideration that in numerous species of *Bidens* the foliage is known positively to vary from tripartite (or even simple) to bipinnate or tripinnatisect. Thus all attempts to defend a specific segregation of the tripartite-

[1] Schulz's confusion of the *refracta* with the *riparia* forms is shown further by certain of his determinations at Berlin. For example, he there referred not only *Tonduz* 13618, but also *Bernoulli & Cario* 1384 and *Gaumer* 2498 to *refracta*. All these are *riparia* proper.

leaved form would seem to be futile and the varietal rank proposed for *B. refracta* Brandeg. by O. E. Schulz is here adopted.

EXPLANATION OF PLATE CXIV

Bidens riparia, figs. *i–p*: *i*, *j*, small fruiting branches, ×0.7; *k*, portion of leaf, enlarged to show ciliation, ×6.3; *l*, exterior involucral bract, ×3.5; *m*, interior involucral bract, ×3.5; *n*, palea, ×3.5; *o* (outer), *p* (inner), achenes, ×3.5; *i*, *l–p*, from type; *j*, *k*, from *Tonduz* 13618, in Hb. U.S.

Bidens riparia var. *refracta*, figs. *a–h*: *a*, fruiting specimen, ×0.7; *b*, portion of leaf enlarged to show ciliation, ×6.3; *c*, exterior involucral bract, ×3.5; *d*, interior involucral bract, ×3.5; *e*, palea, ×3.5; *f*, disc floret, ×3.5; *g* (outer), *h* (inner), achenes, ×3.5; all from *T. S. Brandegee*, Miraflores, Lower California, September 27, 1899, in Hb. Gray.

138. **Bidens Sambucifolia** Cav. Icon. et Descr. 3: 15, *pl. 229*. 1795. Pl. CXV.

Coreopsis Sambucifolia Cav. Descr. 225. 1802.

Bidens alamosana Rose, Contr. U. S. Nat. Herb. 1: 104, *pl. 6*. 1891.

Herba grandis, perennis, glabra, 1.5–3.3 m. alta, ramosa; nonnullis caulibus ex una radice et basi fere 5 cm. crassis, manifeste angulatis. Folia petiolata petiolis 2–3 cm. (vel ultra) longis, petiolo adjecto 8–11 cm. (vel ultra) longa, membranacea, ciliata, pinnata, foliolis quandoque 3 sed saepius 5, lanceolatis vel ovato-lanceolatis, serratis, lateralibus basi inaequilaterali connatis decurrentibusque, terminali longiore. Capitula in ramis singulis corymbosa, radiata, pansa ad anthesin 2.5–3.5 cm. lata et 10–15 mm. alta, pedunculata pedunculis 0.4–1.5 dm. longis, graveolentia et odore *Tageti* similia. Involucrum glabratum vel minute pubescens, totum irregulariter in bracteas lineares vel lineari-lanceolatas 4–6 mm. longas exteriores plerumque 10–12 non semper ab interioribus valde distinctas divisum. Flores ligulati 9–12, ligula oblongo-obovati, apice saepe tridentati, satiate aurantiaci vel interdum fere sed non vere coccinei, 1.2–1.6 cm. longi; tubulosi elongati, tenues, sursum non urceolati, 4- vel 5-dentati. Achaenia linearia, valida, acute quadrangulata, plus minusve recurvata, fusco-nigra vel nigrescentia, glaberrima, corpore 12–18 mm. longa, 4- (rarissime 3- vel 5-) aristata; aristis retrorsum hamosis, 2–3.5 mm. longis, una saepe quam ceteris multo breviore.

Type specimen: Obtained in flower during November in the Royal Botanical Garden of Madrid, from material coming originally,

BIDENS SCHIMPERI Schz. Bip. *ex* Walp. (forms)

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according to Cavanilles, from Peru and Mexico. The citation of Peru, however, is unquestionably erroneous. No specimens are known from Peru. Furthermore, the Pavón specimens cited (Boiss.), which from a comparison of other Pavón herbarium specimens (e.g., "*Bidens odorata* Cav.") are found to be doubtless some of Cavanilles' original material, are labeled "Nueva España" and thus are seen to have come from Mexico.

Distribution: States of Sinaloa and Sonora, northwestern Mexico.

Specimens examined: *T. S. Brandegee,* Culiacán, Sinaloa, September 12, 1904 (Calif.); *idem,* eodem loco, September 20, 1904 (Calif.; Gray); *E. A. Goldman* 247, Valley of Río Fuerte, Sinaloa, October 14, 1898 (Gray); cult. in *Hort. Bot. Neapolit.* (Del.); *J. G. Ortega* 5213, alt. 20 meters, Piaxtla, San Ignacio, Sinaloa, Mexico, July, 1923 (Stanf.); *idem* 6599, Santa María, Syndicure of Baila, Municipality of Culiacán, Sinaloa, Mexico, December, 1926 (Stanf.); *Edward Palmer,* Culiacán, Sinaloa, October 25–November 18, 1891 (U.S.); *idem* 6, Alamos, Sonora, September 16–30, 1890 (Kew); *idem* 278, eodem loco, March 26–April 8, 1890 (type of *Bidens alamosana* Rose, U.S.: cotypes, Boiss.; Calif.; Gray; Kew); *idem* 1715, Imala, Sinaloa, September 25–October 8, 1891 (Gray); ex *Herb. Pavón,* Mexico (Boiss., 2 sheets; Del.); *Rose, Standley, & Russell* 12932, arroyo near Alamos, Sonora, March 16, 1910 (U.S.); *iidem* 14673, river bed, Guadalupe, Sinaloa, April 18, 1910 (U.S.); *iidem* 14907, Culiacán, Sinaloa, April 21, 1910 (U.S.); *Wilhelm Schaffner* 529, in marshy, shady places, near Culiacán, Sinaloa, October, 1866 (Gray; Par.); *I. L. Wiggins* 6429, along bank of Río Cedros at village of Cedros, Sonora, Mexico, March 5, 1933 (Stanf.).

EXPLANATION OF PLATE CXV

Bidens Sambucifolia: a, flowering branch, ×0.95; *b,* exterior involucral bract, ×2.71; *c,* interior involucral bract, ×2.71; *d,* ray corolla, ×2.71; *e,* palea, ×2.71; *f,* disc floret, ×2.71; *g,* anthers, ×10.16; *h,* upper portion of pistil, ×9.48; *a,* mainly from Cavanilles' type plate, but finished from, and figs. *b–h* drawn entirely from a sheet of apparently Cavanilles' original material in hb. Pavón, in Hb. Boiss.

139. **Bidens Gardneri** Baker in Mart. Fl. Bras. 6, pt. 3: 246. 1884. Plate CXVI.

Herba gracilis, parce ramosa, 6–13 dm. alta, brevissime scabrido-hispida vel hic illic glabrata; caulibus ramisque obtuse vel acute tetragonis, supra elongatis, internodiis superioribus folia multo

superantibus. Folia petiolata petiolis 0.5–2.5 cm. longis, petiolo adjecto 3–8 cm. longa, membranacea, ciliata, inferiora plerumque simplicia vel tripartita foliolis ovatis vel ovato-lanceolatis crenato-serratis dentium apice subobtuse indurato-apiculato; superiora (vel raro omnia) bipinnatifida, segmentis lanceolatis. Capitula pauca, radiata, pansa ad anthesin circ. 2.5–3 cm. lata et 8–10 mm. alta, longe tenuiterque pedunculata pedunculis 1–2.1 dm. longis. Involucrum basi hispidum; bracteis exterioribus 10–12, linearibus vel lineari-spathulatis, subacutis, saepe strigosis, 2–3.5 mm. longis; interioribus latius linearibus, 5–7 mm. longis. Flores ligulati 6–8, obscure aurantiaci vel saepius atro-purpurei rubrive (sicci plus minusve cinnamomei), ligula elliptico-oblongi, apice irregulariter dentati, 1.2–1.6 cm. longi; flores disci brunnei. Achaenia linearia, valde tetragona, nigrescentia, glabra vel quaedam strigosa, corpore 7–10 mm. longa, apice 4- (vel rarissime 3-) aristata, aristis inaequalibus, erectis, rigidis, retrorsum et saepe oculis pectinatim hamosis, 1.2–2 mm. longis.

Type specimen: Collected by *George Gardner*, No. 4256, in rocky places at San Domingos, State of Goyaz, Brazil, May, 1840 (Kew, 2 sheets).

Distribution: Paraguay and southern Brazil northward and northeastward through Brazil to the states of Matto Grosso, Goyaz, and Bahia.

Specimens examined: *B. Balansa* 908, Ticada in the great forest of Caaguazú, Paraguay, March 3, 1876 (Kew); *Burchell* 6901 and 6902 (Kew); *Karl Fiebrig* 74, northern Paraguay, 1909 (Hassl.); *idem* 679, Cerros de Tobati, Paraguay, January 10, 1903 (Berl., 2 sheets; Brit.; Del.; Field; Gray; Hassl.; Kew; Mun.); *Gardner* 3850, dry, hilly places, Conceiçâo, Goyaz, February (Kew); *idem* 4256 (type, Kew, 2 sheets: cotypes, Brit.; Webb); *Guilhermo Gehrt*, Ityrapina, São Paulo, Brazil, April 28, 1927 (Field); *Emil Hassler* 1877, in thickets near Piribebuy, Paraguay, February, 1885–1895 (Boiss.; Hassl.; Kew; Par.); *idem* 4253, San Estanislao, Paraguay, August 10, 1898–1899 (Berl.; Boiss.; Brit.; Gen.; Hassl.; Kew; Mus. V.; Par.); *idem* 7454, in ruderal spots near Concepción, Paraguay, September, 1901–1902 (Brit.; Hassl., 2 sheets); *idem* 9177, in fields near Caaguazú, Paraguay, March, 1905 (Del.); *F. C. Hoehne*, State of São Paulo, Brazil, May 21, 1927 (Field); *A. Löfgren* 590, June 5, 1888 (Cop.); *G. O. A. Malme* 1682*B*, ruderal and along road, Buriti near Santa Anna do Chapada, Matto Grosso, Brazil, June 16, 1894 (Stockh., 2 sheets); *idem* 3374, edge of forest, Santa Anna do Chapada, May 17, 1903 (Stockh., 2 sheets); *idem* 3374*a*, in

garden, subruderal, eodem loco, May 16, 1903 (Stockh.); *Merkel*, Brazil (Cop.); *Herm. Meyer* 2, Cuyabá, Matto Grosso, April 16, 1896 (Berl.); *Pohl* 1698 (distrib. No. 413), in front of Barra, Bahia, Brazil (Berl.; Kew, 2 sheets; Mus. V., 3 sheets); *Riedel & Lund* 883, 984, and 2221, in shady places, Araracacoara (Araraquara), Minas Geraes, May, 1834 (herb. ignot.); *T. Rojas* 10260, in fields at margins of forests near Estrella, Sierra de Amambay, Paraguay, March, 1908 (Brit.; Hassl.); *A. St. Hilaire* 1192, State of Rio de Janeiro, Brazil, 1816–1821 (Par.); *Eugene Warming*, Lagoa Santa, Minas Geraes, December 4, 1863 (Cop., 3 sheets; Par.); *idem* 639 pro parte, eodem loco (Cop.); *A. Weddell* 3302, Paraguay, April–May, 1845 (Par., 3 sheets, sub nom. *Bidente rubra* Schz. Bip.; see next paragraph below).

A species with lower part of plant having aspect usually resembling that of *Bidens pilosa* L. The bipinnatifid upper leaves, however, as also the few long peduncles and the radiate flowering heads, distinguish it easily from that species. Occasionally the leaves, all or nearly all, are bipinnatifid, giving the plant a very different appearance. Baker described the ligulate florets as being orange-colored, but a number of dried flowering heads observed in herbaria appear to have the ligules more of a reddish brown or cinnamon color. Fiebrig, on the labels for his No. 679, describes the ligules as fire-red and the disc florets as brown. Hassler, on labels for his No. 4253, describes the ligules as dark purple or obscurely orange-colored. We may note, further, that long before Baker's publication of *Bidens Gardneri*, Schultz Bipontinus had designated the Weddell plant (in herb.) as *Bidens rubra*, evidently for the very reason that its rays were red.

The mature fruiting heads are noticeable for the conspicuous retrorse barbs of the achenes, these barbs suggesting strongly the teeth of a comb.

EXPLANATION OF PLATE CXVI

Bidens Gardneri: a and *d* (lower), *b* and *c* (upper), portions of flowering and fruiting specimens, ×0.59; *e*, lower surface of portion of leaf, enlarged to show pubescence, ×1.76; *f*, exterior involucral bract, ×3.52; *g*, interior involucral bract, ×3.52; *h*, ray corolla, ×3.52; *i*, palea, ×3.52; *j*, achene, ×1.76; *a*, from *Pohl* 413, in Hb. Kew; *b*, *c*, partly from *Gardner* 3850 and partly from 2 sheets of *Pohl* 413, all in Hb. Kew; *d*, from *Fiebrig* 679, in Hb. Field; *e*, *j*, from *Pohl* 413, in Hb. Kew; *f–i*, from *Gardner* 3850, in Hb. Kew.

140. **Bidens flagellaris** Baker in Mart. Fl. Brasil. 6, pt. 3: 248. 1884. Pl. CXVII.

Herba perennis, erecta, glabra, simplex vel copiose ramosa, 0.9–2 m. alta, interdum glauco-viridis, caule primario subtereti. Folia petiolata petiolis marginatis usque ad 1.5 cm. longis, petiolo adjecto plerumque 5–9 cm. longa, nunc pinnatim 3-partita segmentis subulatis gracillimis, elongatis, flexuosis, lateralibus terminali 4.5–8 cm. longo subaequalibus, saepe tantum 0.4–0.6 mm. latis; nunc 2–3-pinnata, segmentis usque ad 2 cm. longis et 1.2 mm. latis, indurato-apiculatis; raro indivisa et foliolo mediano foliorum 3-partitorum similia. Capitula discoidea tenuiter pedunculata pedunculis 3–8 cm. longis, ad anthesin 6–7 mm. lata et 7–11 mm. alta. Involucri bracteae exteriores 7–10, anguste lineares, subacutae, 3–4 mm. longae, quam interiores lanceolatae dimidio breviores. Achaenia linearia, subtetragona, brunnea vel fere nigra, glabra, unica facie plerumque 2-sulcata, corpore 1–1.4 cm. longa et circ. 1 mm. lata, biaristata; aristis subcalvis vel irregulariter retrorsumque hamosis, saepe late divergentibus, circ. 1.5–2.5 mm. longis.

Type specimen: Collected by *George Gardner*, No. 4255, in upland bushy fields between Passé and San Domingos, State of Goyaz, Brazil, May, 1840 (Kew).

Distribution: States of Goyaz and Minas Geraes, Brazil.

Specimens examined: *Gardner* 4255 (type, Kew); *A. Glaziou* 19525, near Diamantina, Minas Geraes, March 28, 1892 (Berl.; Kew; Par.); *Martius*, in fields along brooks, Minas Geraes, May (Mun.); *Mosén* 4217, on dry hills near the Rio Verde, Caldas, Minas Geraes, January 25, 1876 (Stockh.); *A. F. Regnell*, Caldas, Minas Geraes, January 25, 1876 (Par.); *idem* ser. III, 779, Minas Geraes, February 11, 1877 (Berl.; Stockh.); *A. de Saint Hilaire* 1191, eodem loco, 1816–1821 (Par.; forma plus foliosa, foliis 2–3-pinnata); *idem* 1193, eodem loco et tempore (Par.); *idem* 1194, Brazil, 1816–1821 (Par.; foliis inferioribus vel principalibus saepe bipinnatis vel etiam plus minusve tripinnatifidis).

EXPLANATION OF PLATE CXVII

Bidens flagellaris: a (lower), *b* (upper), portions of fruiting and flowering specimen, ×0.63; *c*, exterior involucral bract, ×3.79; *d*, interior involucral bract, ×3.79; *e*, palea, ×3.79; *f*, disc floret, ×2.52; *g*, achene, ×3.79; all from type.

141. **Bidens nudata** Brandeg. Zoë 1: 309. 1890. Pl. CXVIII.

Suffrutescens, glabra, 4–5 dm. alta; caulibus multis, supra interdum fere efoliatis, infra foliosis, basi ligneis. Folia petiolata petiolis

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ad basim membranaceo-connatis 1–3 cm. longis, petiolo adjecto 6–12 cm. longa, bipinnatim dissecta in segmenta longa filiformia 0.3–1 mm. lata integra eciliataque, ultima 0.7–3 cm. longa. Capitula pauca, radiata, pansa ad anthesin ±4 cm. lata et ±1.3 cm. alta, pedunculata; pedunculis tenuibus, nudis vel 1–4- bracteatis, 0.3–1.4 dm. longis. Involucrum glabratum; bracteis exterioribus 7–10, linearibus, acutis, 2.5–6 mm. longis; interioribus lanceolatis, 5–8 mm. longis. Flores ligulati 6–8, flavi, ligula elliptico-obovati, 1–2.2 cm. longi, subintegri vel denticulati, 12–14 striis percursi, styliferi fertilesque. Achaenia atra, linearia (unicum aequaliter latum fere totam longitudinem), tetragona, omnino 8-sulcata, supra strigosa, marginibus costisque interdum subtuberculata, apice biaristata aristis tenuibus et retrorsum hamosis, 2–3 mm. longis; interiora tenuissima, corpore 6–12 mm. longa; exteriora latiora, corpore 5–7 mm. longa, aristis caducis.

Type specimen: Collected by *Townsend S. Brandegee*, No. 318, Sierra de Francisquito, Lower California, Mexico, October 19, 1890 (Calif.).

Distribution: Lower (Baja) California, Mexico.

Specimens examined: *Brandegee*, San Bernardo Canyon, October 13, 1893 (Calif.; Gray); *idem*, Sierra de la Laguna, October 19, 1893 (Kew); *idem* 318 (type, Calif.: cotypes, Field; Phila.); *Harvard University Bot. Gard.*, cult., December 4, 1894 (Gray).

A species distinguished from most others in the genus by the styliferous and fertile ray florets, also by the achenes, which are parallel-sided throughout almost their entire length.

EXPLANATION OF PLATE CXVIII

Bidens nudata: a (lower), *b* (upper), portions of flowering and fruiting specimen, ×0.67; *c*, exterior involucral bract, ×4.67; *d*, interior involucral bract, ×4.67; *e*, ray corolla, ×2; *f*, palea, ×4.67; *g*, disc floret, ×4.67; *h*, anthers, ×17.33; *i*, upper portion of pistil, ×20; *j* (outer), *k* (inner), achenes, ×5.33; *a*, *b*, from *T. S. Brandegee*, Sierra de Laguna, Lower California, October 19, 1893, in Hb. Kew; *c*, *d*, *f–k*, from cotype in Hb. Field; *e*, from specimen cultivated in *Harvard University Botanical Garden*, December 4, 1894, in Hb. Gray.

142. **Bidens brasiliensis** Sherff, Bot. Gaz. 81: 49. 1926.
Pl. CXIX.

Herba perennis, erecta, simplex vel supra ramosa, plus minusve tomentosa, ±1 m. alta. Folia principalia sessilia, indivisa, rhomboideo-elliptica, utrinque sensim angustata, membranacea, molliter

denseque tomentosa, acriter numerosis dentibus serrata, 6–9 cm. longa et 2.5–4 cm. lata; folia ramorum linearia, minora. Capitula subnumerosa (±40), discoidea, florescentia ±8 mm. alta et ±6 mm. lata, demum cum fructibus circ. 1.3 cm. longa et 1–2 cm. lata. Involucri glabrati bracteae exteriores 5–8, lineares, subacute indurato-apiculatae, 3–6 mm. longae, interiores lanceolatae 7–10 mm. longae. Paleae achaeniorum corpora aequantes vel superantes. Achaenia atra, linearia, tetragona, omnino 8- (facie unaquaque 2-) sulcata, glabra vel supra sparsissime erecto-setosa, exalata, corpore 1–1.3 cm. longa et circ. 1 mm. crassa, ad apicem erecto-setosa et biaristata; aristis calvis vel saepius 1–3 hamis minutis retrorsum hamosis, usque ad 2.3 mm. longis, interdum deficientibus.

Type specimen: Collected by *Auguste de Saint Hilaire*, No. 1196, State of Minas Geraes, Brazil, 1816–1821 (Par.).

Distribution: State of Minas Geraes, Brazil.

Specimens examined: *Saint Hilaire* 1196 (type, Par.).

In general habit *B. brasiliensis* resembles simple-leaved plants of *B. Riedelii* Baker and *B. Chodati* Hassler. It differs from the former in its more numerous heads, its lack of ray florets, its elongate, aristate achenes, etc.; from the latter, in its wider and more rhombic leaves, more numerous heads, smaller involucres with much more nearly glabrous and less numerous bracts, etc. The type had been collected by Saint Hilaire in two portions representing separately the lower, leafy stem and the branched, fruiting top. Both of these are taken as the basis for the description.

EXPLANATION OF PLATE CXIX

Bidens brasiliensis: a (lower), *b* (upper), portions of flowering and fruiting specimens, ×0.6; *c*, *d*, small portions of stem and leaf enlarged to show pubescence, ×1.5; *e*, exterior involucral bract, ×3.6; *f*, interior involucral bract, ×3.6; *g*, palea, ×3.6; *h*, disc floret, ×3.6; *i*, achene, ×3.6; all from type.

143. **Bidens Riedelii** Baker in Mart. Fl. Bras. 6, pt. 3: 246. 1884. Pl. CXX, figs. *a–k*.

Gymnopsis glaberrima Schz. Bip. ex Baker, loc. cit.

Bidens Riedelii var. *typica* et f. *intermedia* Chod. & Hassl. Bull. Herb. Boiss. ser. 2. 3: 726. 1903.

Caulis glaber.

Folia principalia simplicia.....*B. Riedelii* sensu stricto.

Folia omnia pennisecta.....var. *β. Hassleriana.*

Caulis hispido-pilosus.....var. *γ. hirsuta.*

BIDENS MUSOZIANA Sherff

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Perennis, glabra, parce ramosa, 5–10 dm. alta; caulibus gracilibus, caespitosis, firmis, teretibus, e radice lignosa. Folia inferiora 4–6 juga contigua, subsessilia vel breviter petiolata petiolis usque ad 1 cm. longis, petiolo adjecto 3–5 vel etiam usque ad 10 cm. longa, simplicia, firmula, rarius ovata saepius ovato-lanceolata vel anguste oblongo-lanceolata, apice subacuta vel acuminata, margine argute serrata, non ciliata, basi cuneata. Capitula pauca, radiata, pansa ad anthesin circ. 4 cm. lata et 9–12 mm. alta, tenuiter pedunculata pedunculis 5–11 cm. longis. Involucrum basi glabrum, bracteis triseriatim dispositis; extimis atque intermediis simul circ. 12–14, similibus, linearibus, subcarnosis, subobtusis, ciliatis, 4–6 mm. longis; interioribus lanceolatis, 6–9 mm. longis. Flores ligulati 6–9, cinnamomeo-rubri, ligula cuneato-elliptici, apice obsolete denticulati, 1.5–2.8 cm. longi; flores tubulosi cylindrici et non infundibuliformes. Achaenia oblanceolata, subtetragona, brunnea, glabra, 8–9 mm. longa, setis abortivis.

Type specimen: Collected by *Ludwig Riedel*, No. 553, in dry fields at the Rio Pardo, Brazil, September, 1826 (Kew, ex Petrop.).

Distribution: Paraguay and southern Brazil.

Specimens examined: *B. Balansa*, in fields, Caaguazú, Paraguay, March 24, 1876 (Kew); *E. Hassler* 5580, on high plateau and slopes, Sierra de Maracayú, Paraguay, December (Boiss.; Kew; Par.); *idem* 5707, in region of the headwaters of the Río Jejui-guazú, Paraguay, December, 1898 (Boiss.; Brit.; Del.; Kew; Par.); *idem* 7910, in region of the headwaters of the Río Apa, Paraguay, November, 1901 (Berl.; Gen.; Gray; Hassl.; Kew, 2 sheets; Mus. V.; Par., 2 sheets); *idem* 7910*a*, eodem loco, December, 1901 (Hassl., 2 sheets; forma varietati *Hasslerianae* adpropinquans); *idem* 9348, in fields, near Caaguazú, Paraguay, March, 1905 (Hassl.); *Riedel* 553 (type, Kew: cotypes, Gray; Par., 2 sheets; Petrop., 2 sheets); *T. Rojas* 9888, on high plateau and slopes, Sierra de Amambay, etc., Paraguay, December, 1907 (Berl.; Brit.; Hassl., 2 sheets; Mus. V.; Par.).

Bidens Riedelii var. *β.* **Hassleriana** Chod. Bull. Herb. Boiss. 2. 2: 395. 1902. Pl. CXX, fig. *l.*

A forma typica differt foliis omnibus pennisectis, sparsim hispidis, lobis linearibus incisis.

Type specimen: Collected by *Emil Hassler*, No. 5708, in a field near the upper course of the Río Jejui-guazú, vicinity of Yerbales, Sierra de Maracayú, Paraguay, December, 1898 (Boiss.).

Distribution: Paraguay and northeastern Argentina.

Specimens examined: *Hassler* 5708 (type, Boiss.: cotypes, Brit.; Hassl.; Kew; Mus. V.); *idem* 12079, Sierra de Amambay, Paraguay, January, 1913 (Berl.; Brit.; Hassl., 2 sheets; Kew; Par.); *Niederlein* 414, Cerro de Santa Ana, Misiones Terr., Argentina, March, 1884 (Berl.).

Bidens Riedelii var. γ. **hirsuta** Hassl. Repert. Sp. Nov. 14: 272. 1916.

Caulis hispido-pilosus, folia supra et subtus scaberulo-pilosa.

Type specimen: Collected by *Emil Hassler*, No. 12045, in fields of high plateau, "Serrados," Sierra de Amambay, Paraguay, June, 1912–1913 (Hassl., 2 sheets).

Distribution: Paraguay and northeasternmost Argentina.

Specimens examined: *Hassler* 12045 pro parte (2 type sheets, Hassl.: cotypes, Berl.; Del., 2 sheets, parce hirsuta; Kew; Mus. V.; Par., 2 sheets); *P. Jörgensen*, Bonpland, Government of Misiones, Argentina, December 18, 1909 (Field).

A form looking very different from the species at first glance, because of the pronounced hairiness. The hairiness is not a very positive character, however, since the Delessert specimens are somewhat smoothish and the specimen at the British Museum of Natural History (omitted above) is distinctly glabrous.

EXPLANATION OF PLATE CXX

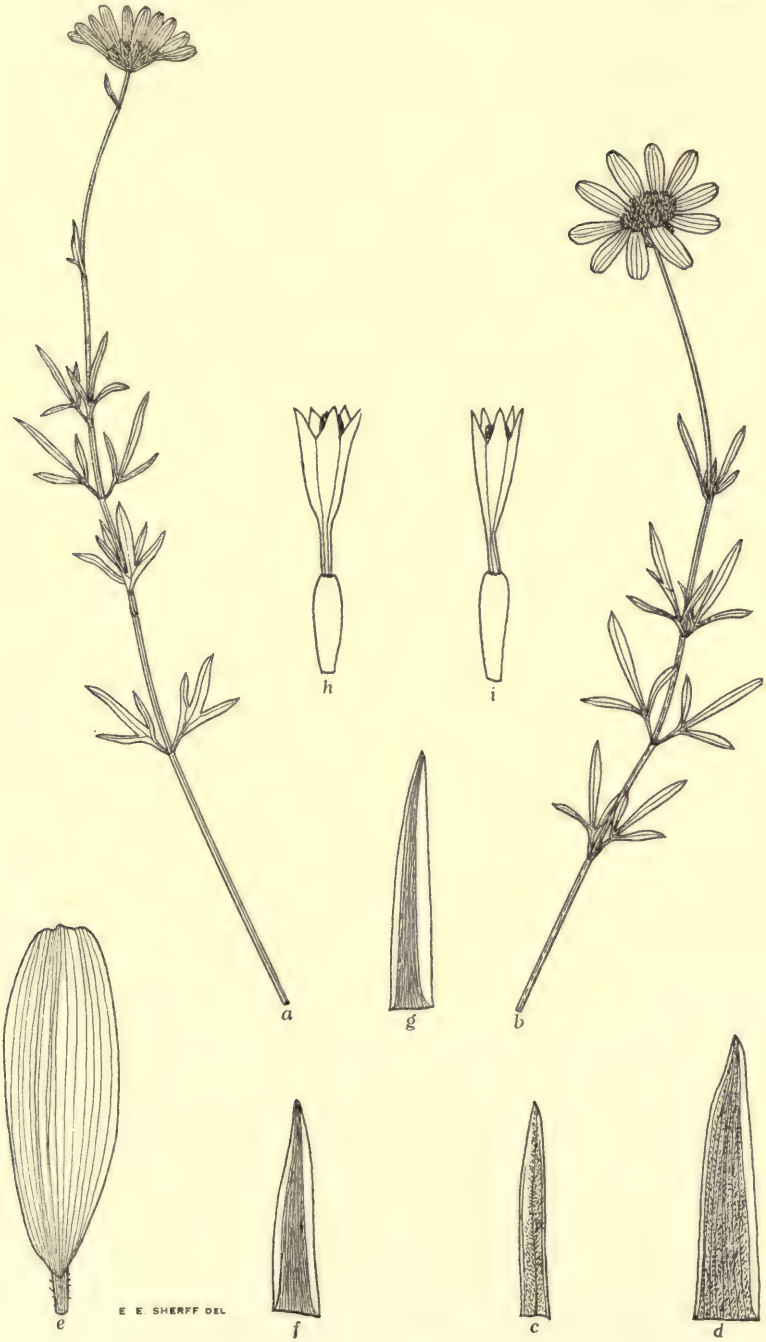
Bidens Riedelii, figs. *a–k: a* (lower), *b* (median), *c* (upper), portions of flowering specimen, ×0.66; *d*, ray floret, ×1.33; *e*, ray floret, ×3.33; *f*, smaller plant than in *a–c*, ×0.66; *g*, pair of larger cauline leaves, ×0.66; *h*, exterior involucral bract, ×3.33; *i*, interior involucral bract, ×3.33; *j*, palea, ×3.33; *k*, disc floret, ×3.33; *a–c*, from *Hassler* 5707, in Hb. Kew; *d*, *e*, from *Hassler* 7910, in Hb. Gray; *f*, *g*, from type; *h–k*, from cotype, in Hb. Gray.

Bidens Riedelii var. *Hassleriana*, fig. *l:* typical cauline leaf, ×0.67; from *Hassler* 12079, in Hb. Brit.

144. **Bidens Chodati** Hassl. Repert. Sp. Nov. 12: 369. 1913. Pl. CXXI.

Bidens graveolens var. *comosa* Chod. Bull. Herb. Boiss. 2. 2: 394. 1902.

Herbacea forsitan interdum suffruticosa, erecta vel suberecta, 1–2 m. alta; caule simplici, apicem versus vix in ramos 2–3 erectos diviso, glabro, tereti, basim versus usque ad 6 mm. crasso; internodiis inferioribus mediisque 4–7 cm. longis, superioribus usque ad 19 cm. longis. Folia sessilia, semi-amplexicaulia et basibus inter se



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connata; nunc omnia lanceolata vel ovato-lanceolata, acuta, basi rotundata, subcoriacea, margine argute serrata dentibus apice acute mucronulatis ac saepe incurvescentibus, supra breviter hispidula, infra pallidiora et dense tomentosulo-pubescentia, 7–10.5 cm. longa et 2.4–4.2 cm. lata; nunc superiora vel inferiora vel etiam omnia minora, profunde pinnatifida, segmentis oblongo-linearibus, acutis, mucronulatis, rhachi late alata. Capitula pauca, terminalia, pedunculata pedunculis nudis bracteatisve erectis et 1–9 cm. longis, radiata, pansa ad anthesin 2–3 cm. lata et 11–13 mm. alta. Involucrum setulis squarrosis valde hispidulum; bracteis exterioribus plerumque 8–12, linearibus, acute calloso-apiculatis, 8–14 mm. longis; interioribus paulo latioribus et parce brevioribus (vel juvenibus triplo brevioribus). Flores ligulati circ. 10, lutei, ligula late lanceolati, striis circ. 10 purpureis parallelis percursi, extus dense flavido-pubescentes, intus glabrescentes, apice subacuti flavido-puberulique, circ. 1.2 cm. longi et 3–3.5 mm. lati. Achaenia linearia, tetragona, glabra, griseo-nigra, corpore circ. 1–1.2 cm. longa et circ. 1.2 mm. lata, biaristata; aristis erecto-patentibus, retrorsum hamosis vel demum glabratis, 2.5–3.5 mm. longis.

Type specimens: Collected by *Emil Hassler*, No. 3757, in rocky places, Cordillera de Altos, Paraguay, January, 1899 (Hassl., 2 sheets).

Distribution: Known only from type locality in Paraguay.

Specimens examined: *Karl Fiebrig* 571, Cordillera de Altos, December 7, 1902 (Berl., 5 sheets, inferioribus vel omnibus foliis pinnatis; Brit.; Del.; Kew; Hassl.; Mun.); *Hassler* 3757 (type, Hassl., 2 sheets).

EXPLANATION OF PLATE CXXI

Bidens Chodati: a (lower), portion of plant, ×0.62; *b* (upper), portion of flowering specimen, ×0.62; *c*, compound leaf from another specimen, ×0.62; *d*, small portion of leaf from *a*, enlarged to show pubescence, ×2.48; *e*, exterior involucral bract, ×2.48; *f*, interior involucral bract, ×2.48; *g*, palea, ×2.48; *h*, disc floret with immature achene, ×2.48; *i*, achene, ×2.48; *a*, *d*, from one sheet of *Fiebrig* 571, in Hb. Berl.; *b*, *e–i*, from 2nd sheet of same, ibid.; *c*, from 3rd sheet of same, ibid.

145. **Bidens Pringlei** Greenm. Proc. Amer. Acad. 41: 263. 1905. Pl. XCV, figs. *a–h*.

Herba perennis; caulibus adscendentibus, basi ligneis, viridibus vel subpurpurascentibus, manifeste tetragonis, infra glabratis vel

glabris, supra cano-pubescentibus setis brevibus, 3–4.5 dm. longis. Folia petiolata petiolis 1–2.5 cm. longis, petiolo adjecto 3–9 cm. longa, 1.5–5.5 cm. lata, 1–3-pinnatisecta, glabra; segmentis ultimis anguste linearibus, apice acutissimis, indurato-apiculatis, 0.5–5.5 cm. longis et 0.3–1.3 mm. latis. Capitula pauca, tenuiter pedunculata pedunculis 0.5–1.5 dm. longis, radiata, pansa ad anthesin 2.5–3 cm. lata et 8–12 mm. alta. Totum involucrum plus minusve cano-hispidum; bracteis exterioribus circ. 15, anguste linearibus, ciliatis, apice acriter indurato-mucronulatis, 4–5 mm. longis, interiores oblongo-lanceolatas subaequantibus. Flores ligulati 8–10, albidi vel rosacei, ligula anguste obovati, apice truncato grosse dentati, 1.3–1.6 cm. longi. Achaenia (submatura) linearia, subtetragona, supra attenuata, subnigra, marginibus et summis faciebus erecto-setosa, 2- vel 3-aristata aristis retrorsum hamosis 1–2 mm. longis, corpore exteriora 6–9 mm. et interiora 9–13 mm. longa.

Type specimen: Collected by *Cyrus Guernsey Pringle*, No. 8844,[1] at altitude of 1,525 meters, in fields near Uruapan, State of Michoacán, Mexico, October 8, 1904 (Gray).

Distribution: Mexico, from southern part of State of Coahuila to State of Michoacán.

Specimens examined: *J. Gregg* 438, mountains near Saltillo, Coahuila, September 3, 1848 (Gray; Kew; Mo.); *Pringle* 8844 (type, Gray: cotypes, Berl.; Boiss., 3 sheets; Brit.; Calif.; Carn.; Cop.; Del.; Field, 2 sheets; Kew; Mun.; Mus. V., etc.).

EXPLANATION OF PLATE XCV, FIGS. *a–h*

Bidens Pringlei: a, b, flowering and fruiting branches, ×0.7; *c,* exterior involucral bract, ×3.5; *d,* interior involucral bract, ×3.5; *e,* ray floret, ×3.5; *f,* palea, ×3.5; *g,* disc floret, ×3.5; *h,* achene, ×3.5; all from type.

146. **Bidens angustissima** H.B.K. Nov. Gen. et Sp. 4: 183 (233). 1820. Pl. CXXII, figs. *h–m.*

Bidens angustifolia H.B.K. op. cit. 7: 359 (456). 1825 (cf. Sherff, Bot. Gaz. 88: 286. 1929).

Folia 3–5-partita.....*B. angustissima* sensu stricto.
Folia indivisa.....var. *β. Linifolia.*

Herba erecta, glabra vel sparsim pubescens, perennis e radice lignea, erecte ramosa, graveolens, 3–7.5 dm. alta, ramis quadrangularibus. Folia petiolata petiolis ciliatis 0.6–1.5 cm. longis, 3–5-partita;

[1] The original description gives the number erroneously as 8814. The type and various cotype sheets examined bear a printed label with number 8844.

BIDENS WHYTEI Sherff (figs. *a–g*)
BIDENS AMBIGUA S. L. Moore (figs. *h–m*)

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foliolis angustissime linearibus, plerumque 0.3–0.6 mm. latis, apice acuto-mucronatis, integerrimis, plerumque glabris, subcarnosis, inaequalibus, lateralibus 1–4 cm. longis, terminali 4–6 cm. longo. Capitula terminalia, longe pedunculata pedunculis usque ad 15 cm. longis, radiata, pansa ad anthesin 2–2.5 cm. lata et 6–9 mm. alta. Involucri bracteae exteriores 8–10, lineares vel spathulato-lineares, apice acute indurato-mucronulatae, glabriusculae vel interdum irregulariter ciliatae, ad anthesin 3–4.5 mm. longae et circ. 0.4–0.6 mm. latae; interiores lanceolatae, margine manifeste diaphanae, tergo dense et perspicue piloso-hispidae, ad anthesin 5–7 mm. longae. Flores ligulati circ. 8, aurantiaco-flavi, glabri, ligula late elliptico-oblanceolati, apice tridenticulati, 8–10 mm. longi. Achaenia immatura tenuissime linearia (lateribus paribus intervallis inter se distantibus), obcompresso-tetragona, glabra vel supra obscure setoso-hispida, straminea, biaristata aristis tenuibus, retrorsum hamosis, circ. 3 mm. longis.

Type specimen: Collected by *Alexander Humboldt* and *Aimé Bonpland* in rather cold places at altitude of 2,340 meters, near the western boundary of the State of Guanajuato (near Los Joares and Santa Rosa de la Sierra), Mexico, in September, 1803–1804 (Par.).

Distribution: Mexico, from State of San Luis Potosí southwestward across State of Guanajuato to northeasternmost Jalisco.

Specimens examined: *Thomas Coulter* 375 pro parte, Mexico (Kew, cum var. *Linifolia* lecta); *Humboldt & Bonpland* (type and cotype, Par.); *C. C. Parry & Edward Palmer* 486, alt. 1,800–2,400 meters, central Mexico, 1878 (Boiss.; Gray; Kew; Mo.; Phila., 2 sheets); *J. G. Schaffner* 203 pro parte, in marshes near Morales, San Luis Potosí, September, 1876 (Boiss., cum *B. Schaffneri* commixt.; Brit.; Gray; Mun.); *Walther Schumann* 110, Jaral Mts., October 10, 1886 (Berl.).

Bidens angustissima var. *β.* **Linifolia** (Schz. Bip. ex Klatt) Sherff, Bot. Gaz. 81: 49. 1926. Pl. CXXII, figs. *a–g.*

Coreopsis linearifolia DC. Prodr. 5: 570. 1836.

Bidens Linifolia Schz. Bip. ex Klatt, Flora 68: 203. 1885.

A specie differt foliis indivisis, saepius 1–2 mm. latis.

Type specimen: Collected by *Carl Ehrenberg,* No. 356, near Mineral del Monte, District of Huajalote, State of Hidalgo, Mexico.[1]

Distribution: Known only from the State of Hidalgo, Mexico.

[1] Schultz Bipontinus' specimen is at Paris (Par.), while the specimen studied by Klatt is doubtless another, perhaps one of the Berlin plants (Berl.).

Specimens examined: *Ehrenberg* 356 (type material: Berl., 2 sheets; Par.); *idem* 386, eodem loco (Berl.); *C. G. Pringle* 6924, alt. 2,850 meters, granitic ledges, Cerro Ventoso above Pachuca, August 18, 1898 (Berl.; Boiss.; Carn.; Del.; Field; Kew; Mo.; Mun.; N.Y.; Par.; Phila.; Mus. V.; U.V., etc.).

The type of *Bidens angustissima* is matched very well by Schultz Bipontinus' type of the var. *Linifolia*, except that the latter has only simple leaves, while the former has tripartite leaves. Klatt, in publishing the description of his *B. Linifolia*, described the heads as discoid, but that rays were present on at least the Paris material is shown by Schultz Bipontinus' label, in his own handwriting, which reads, "achs. rad. calva. . . . " Furthermore, Pringle collected many fine specimens of the simple-leaved form, and these all show orange-yellow rays, about 8 on each head. The only difference to be found between the two species is the questionable one of foliage (cf. Sherff, Bot. Gaz. 64: 34. 1917).

At Gray Herbarium there is a single sheet (*Coulter* 375, Mexico) with three slender but well developed specimens; the largest one, at the left, matching the type of *B. angustissima*, and the other two, at the right, matching the type of *B. Linifolia*. From these it is evident that the simple-leaved form does not merit higher than varietal rank.

The type material of *Coreopsis linearifolia* DC. (leg. *Keerl*, Tlapujahua, Mexico; Del.) I have not seen. I rely upon the determination "*Bidens angustissima* H.B.K." communicated by Dr. S. F. Blake (in lit.), who made a study of the material in 1924,[1] also the fact that DeCandolle classified his species among those having undivided leaves.

EXPLANATION OF PLATE CXXII

Bidens angustissima, figs. *h–m: h*, flowering branch, ×0.69; *i*, exterior involucral bract, ×3.46; *j*, interior involucral bract, ×3.46; *k*, ray corolla, ×2.77; *l*, palea, ×3.46; *m*, disc floret with immature achene, ×3.46; all from Bonpland's private cotype, in Hb. Par.

Bidens angustissima var. *Linifolia*, figs. *a–g: a* and *b*, a flowering specimen, ×0.69; *c*, exterior involucral bract, ×3.46; *d*, interior involucral bract, ×3.46; *e*, ray corolla, ×2.77; *f*, palea, ×3.46; *g*, disc floret, ×3.46; *a*, *b*, mainly from Schultz Bipontinus' specimen of *Ehrenberg* 356 (type collection), in Hb. Par.; rest from *Pringle* 6924, in Hb. Field.

[1] Cf. Bot. Gaz. 85: 16. 1928.

BIDENS MICROCARPA Sherff (figs. *a–h*)
BIDENS GRACILIOR (O. Hoffm.) Sherff (figs. *i–p*)

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147. **Bidens Anthemoides** (DC.) Sherff, Bot. Gaz. 56:493. 1913; ibid. 59: 306. 1915; ibid. 76: 153. 1923. Pl. LXXXIV, figs. *a–j*.

Coreopsis Anthemoides DC. Prodr. 5: 573. 1836.

Bidens sarmentosa Greenman, Proc. Amer. Acad. 41: 264. 1905.

Bidens alpina Brandegee, Zoë 5: 239. 1907–1908.

Bidens Coreopsidioides Schz. Bip. ex. Sherff, Bot. Gaz. 56: 493. 1913.

Bidens Schaffneri Schz. Bip. ex Sherff, loc. cit.; non *Bidens Schaffneri* (Gray) Sherff.

Bidens Purpusorum Bitter & Petersen ex Bitter, Repert. Sp. Nov. 17: 335. 1921.

Herba annua (vel interdum perennis?), demissa, saepe ramosissima, 1–2.5 (rariter –5.7) dm. alta, glabra vel inconspicue hispida, caule ramisque saepe radicans, habitu fere *Anthemidis arvensis* L. Folia petiolata petiolis 0.4–3 cm. longis, petiolo adjecto 1–5 (–7.5) cm. longa, pinnata vel bipinnata (rarissime 3–5-partita foliolis ovatis vel ovato-lanceolatis); segmentis linearibus, acutis, indurato-apiculatis, crasso-marginatis, non ciliatis. Capitula radiata, pansa ad anthesin 1.4–2 (rariter –2.8) cm. lata et 7–9 mm. alta, pedunculata pedunculis terminalibus tenuibus 1–5 (–7.5) cm. longis. Involucri basis glabra vel hispida, bracteis subaequalibus; exterioribus 6–10, linearibus, glabris vel sparsim ciliatis et interdum hispidis, 2–5 mm. longis. Flores ligulati plerumque 5, flavi, ligula lanceolato-elliptici vel late obovati, apice integri vel denticulati vel etiam lobulato-dentati et plus minusve emarginati, 0.6–1.3 cm. longi. Achaenia linearia, atra, apicem versus plerumque non attenuata, glabra vel parce strigosa, exalata, apice plerumque dilatata et exaristata vel interdum biaristata aristis suberectis vel patentibus nunc glabris et 0.1–1 mm. longis nunc (rarius) retrorsum hamosis et 1–3.5 mm. longis, corpore 4–7 (rariter –11) mm. longa et 0.7–1.2 mm. lata.

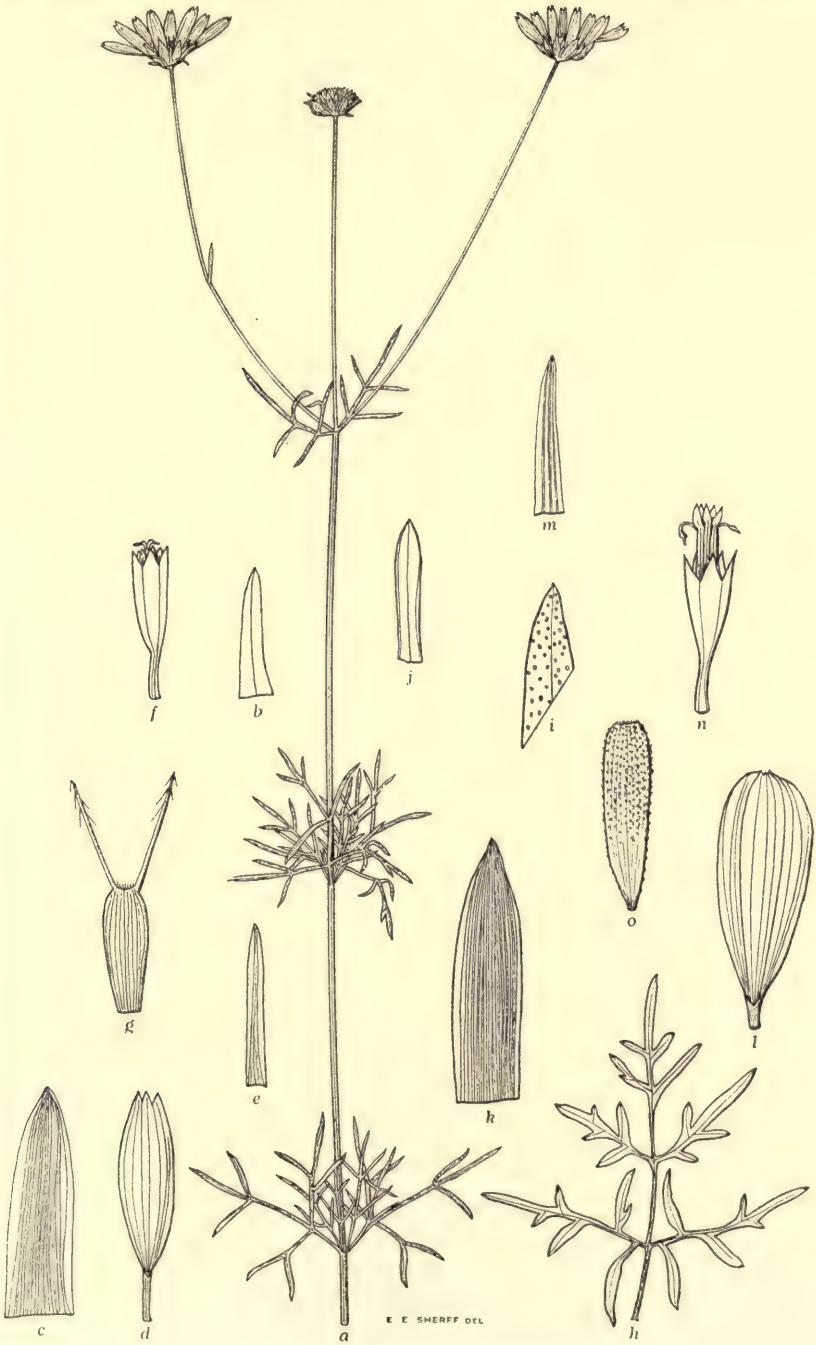
Type specimen: Collected by *Jean Luis Berlandier*, No. 1030, at Cordillera de Guchilaque (near Cuernavaca, State of Morelos), Mexico, October 21, 1827 (Del.).

Distribution: From the State of Vera Cruz westward to the states of Mexico and Morelos, Mexico.

Specimens examined: *Barnes & Land* 369, alt. 2,940 meters, lava fields, La Cima, Federal Distr., October 14, 1908 (Field; Kew); *Berlandier* 1030 (type, Del.: cotypes, Berl.; Brit.; Del.; Hll.; Oxf.; Par., 2 sheets; Stockh.); *Bourgeau* 836, deserts (tablelands) near City of Mexico, Federal Distr., September 8, 1865 (Berl.; Boiss.; Del.; Gray; Kew, 2 sheets; Par., 3 sheets); *I. W. Clokey* 1860, rocky hill-

side, Real del Monte, Hidalgo, September 15, 1910 (Mo.); *Coulter* 378, Mexico (Gray; Kew); *Ehrenberg* 436, Mineral del Monte, Distr. Huajalote, Hidalgo (Berl., 2 sheets; Gray; Par.); *H. M. Hall*, from Mexican material cultivated on University of California Campus, Berkeley, California, August 28, 1911 (U.S.); *Hort. Bot. Hauniensi*, cultivated in 1921 (type material, *Bidens Purpusorum* Bitt. & Pet., Cop., 2 sheets); *Mr. & Mrs. J. G. Lemmon*, Ajusco Mountains, State of Mexico, 1905 (Calif.); *Liebmann* 647, Cerro León, July, 1841 (Cop., 2 sheets); *Fred Müller* 525, at foot of Mt. Orizaba, August, 1853 (Mus. V.; Petrop.); *idem* 527, Orizaba, August, 1853 (N.Y.); ex *Herb. Pavonii* ex Mexico (Boiss., 2 sheets); *C. G. Pringle* 10130, volcanic sand, Ajusco Station, Federal Distr., December 5, 1905 (Berl.; Boiss.; Brit.; Cop.; Del.; Field; Kew; Mo.; Mun.; Mus. V.; Par.); *idem* 11486, alt. 2,850 meters, Serranía de Ajusco, Ajusco Station, Federal Distr., November 9, 1903 (type of *Bidens sarmentosa* Greenm., Gray: cotypes, Berl.; Cop.; Kew); *C. A. Purpus*, fields, Esperanza, Vera Cruz, August, 1907 (Calif., forma usque ad 4 dm. alta); *idem* 1648, gravelly soil about timber line, Mt. Popocatapetl, November, 1905 (cotypes, *Bidens alpina* Brandeg.: Berl.; Brit.; Field; Mo.; U.V.); *idem* 3037, sandy soil, Mt. Popocatapetl, September, 1908 (Berl.; Brit.; Del., 2 sheets; Field; Mo.; Par.; Calif.); *idem* 3634, Esperanza, Puebla, 1909 (Calif.); *J. N. Rose & R. Hay* 5812, Mt. Orizaba, July 26, 1901 (Gray); *J. N. Rose & J. H. Painter* 7881, Nevada de Toluca, State of Mexico, October 15, 1903 (U.S.); *Schaffner*, mountainous places, Mexico, September, 1855 (Gray); *idem* 293, in mountains, Mexico, October, 1855 (Gray); *H. Schenck* 459, alt. about 3,800 meters, ridge between Mt. Popocatapetl and Mt. Ixtaccihuatl, September 10, 1908 (Berl.); *Schiede*, near Tepeyahualco, Puebla, September, 1829 (Berl.); *Schmitz*, Valley of Mexico, State of Mexico (Mus. V., 3 sheets); *H. E. Seaton* 272, alt. 2,700 meters, Mt. Orizaba, August 8, 1891 (Field; Gray); *idem* 497, alt. 2,400 meters, between Mt. Orizaba and Esperanza, Vera Cruz, August 15, 1891 (U.S.); *J. G. Smith*, Mexico, 1892 (Mo.); *Tate*, Mexico (Kew); *Uhde* 620 and 621, Mexico (Berl.).

Asa Gray (Proc. Amer. Acad. 19: 15. 1883) carefully considered this species, but retained it in *Coreopsis*, the taxonomic distinctions between which and *Bidens* he admitted frequently in his writings to be highly artificial. It is interesting to note, however, that Schultz Bipontinus had given, previous to Gray's observations, the names *Bidens Coreopsidioides* (not *B. Coreopsidis* as in Gray, loc. cit.) and



BIDENS PALUSTRIS Sherff (figs. *a–g*)
BIDENS TAYLORI (S. L. Moore) Sherff (figs. *h–o*)

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Bidens Schaffneri to specimens of this species sent to the Gray Herbarium and to the Berlin Herbarium.

The type (*Berlandier* 1030) is matched well by the type of *Bidens sarmentosa* Greenm. (*Pringle* 11486) and that of *Bidens alpina* Brandeg. (*Purpus* 1648—not 1684 as erroneously printed in Brandeg., loc. cit.). The general habit suggests strongly that of *Anthemis* (*A. arvensis* L.), whence the specific name. I have seen two old specimens in the herbarium of Pavón (Boiss.) from Mexico, which were evidently cultivated forms belonging here. The larger one is more than 3.6 dm. high; the smaller one bears a fruiting head with achenes up to 8 mm. long and having naked, variously spreading or even somewhat reflexed aristae 1.5–2 mm. long. These are the *Bidens bipinnatifida* Herb. Pav. (nec aliorum).

The varying treatments accorded this species have been discussed in earlier papers (Sherff, op. cit., 1913, 1915, and 1923). Recently Bitter has published the new name *Bidens Purpusorum* Bitt. & Petersen for a plant the ripe achenes of which were collected in 1908 by C. A. Purpus in fields in the vicinity of Esperanza, Vera Cruz, Mexico, and sent to the Bremen Botanical Garden under the name of *Bidens grandiflora* Balb. In the herbarium of the University of California are two specimens collected by Purpus and bearing field data essentially similar to those given by Bitter. The first was collected at Esperanza in August, 1907, not "1908," and matches Bitter's description well. The second was collected at Esperanza in 1909, and distributed under the name of "*Bidens pilosa* Linn.? Form." It is *Purpus* 3634. This second plant differs in being more branched and in having merely 3–5-parted leaves, not 2–3-pinnatifid leaves.[1] Both forms have most of the achenial aristae retrorsely barbed, but in this and other respects are connected with typical *Bidens Anthemoides* by a large number of herbarium specimens examined.

Similarly, the specimens cited above (vide sub *Hort. Bot. Hauniensi*), raised at the Botanical Garden of Copenhagen from the achenes of the type material of *Bidens Purpusorum* (Cop.), are found to be referable at once to *Bidens Anthemoides*.

The type material for *B. Anthemoides*, *B. sarmentosa*, and *B. alpina* was in each case the more common, small, alpine form, 0.5–2

[1] In a number of species of *Bidens* a strong degree of polymorphism is known to occur among the leaves; for example, *B. aurea* (Ait.) Sherff, *B. triplinervia* H.B.K., *B. andicola* H.B.K., *B. Chrysanthemifolia* (H.B.K.) Sherff, and *B. squarrosa* H.B.K. The difference in the leaves, therefore, does not appear to be of much importance in this case.

dm. tall. Taller forms are sometimes found, the taller of the above-mentioned Pavón Herbarium specimens being an example. The plant collected by Henry E. Seaton, No. 272, was over 4 dm. tall. The plants cultivated in Bremen from achenes sent by Purpus grew about 5 dm. tall. An exceptional specimen by Schiede from Tepeyahualco (Berl.) measures over 5.7 dm. in height. In 1917, Professor H. M. Hall of the University of California sent me from the botanical garden of that university several specimens of this species for determination. He wrote: "It has been in our botanical garden for a long time without name . . . . It is rather attractive and is being used to some extent as a bedding plant." The largest specimen measured about 4 dm. high, and many of the immature achenes had aristae retrorsely barbed.[1] The occasional presence here of retrorsely barbed aristae in a species usually lacking them demonstrates again the impracticability of using the presence or absence of such aristae as a distinguishing character for *Bidens* and *Coreopsis* (cf. Sherff, Bot. Gaz. 59: 307. 1915). For 147*a*. **Bidens Muelleri** Sherff, see p. 645.

EXPLANATION OF PLATE LXXXIV, FIGS. *a–j*

Bidens Anthemoides: a, flowering and fruiting spray, ×0.65; *b*, exterior involucral bract, ×5.23; *c*, interior involucral bract, ×5.23; *d*, ray corolla, ×5.23; *e*, palea, ×5.23; *f*, disc floret, ×5.23; *g*, anthers, ×26.16; *h*, pollen grain, ×261.6; *i*, upper portion of pistil, ×26.16; *j*, achene, ×5.23; all from *Pringle* 11486 (type of *Bidens sarmentosa* Greenm.), in Hb. Gray.

148. **Bidens andicola** H.B.K. Nov. Gen. et Sp. 4: 186 (237). 1820. Pl. CXXIII, figs. *a–d* and *h–p*.

Bidens fruticulosa Mey. & Walp. Nov. Act. Nat. Cur. 19, Suppl. 1: 271. 1843.[2]

Bidens Cosmantha var. *diversifolia* Griseb. Symb. Argent. 198. 1879.

Bidens andicola vars. *normalis* and *heterophylla* O. Kuntze, Rev. Gen. Pl. 3, pt. 2: 136. 1898.[3]

Capitula subradiata.

Capitula pansa ad anthesin circ. 5 mm. lata. . . . var. ϵ. *Mandonii*.

[1] Dr. Hall examined for me three sheets of material from the same original source (Calif.), and reported that one sheet had exaristate achenes. Thus here, as already seen in many other cases, plants of the same collection are found to vary decidedly in the matter of achenial aristae.

[2] See also remarks upon *Bidens diversifolia* Willd. ex DC. under *B. pilosa* var. *alausensis* (H.B.K.) Sherff.

[3] *Coreopsis patula* Willd. (forsan ined.) was the name given to *Bonpland* 3125 (Par.), from equatorial America. The leaves were small, mostly tripartite.

BIDENS SCHLECHTERI Sherff (figs. *a–i*)
BIDENS HOFFMANNII Sherff (figs. *j–p*)

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Capitula pansa ad anthesin circ. 7–8 mm. lata.
var. γ. *Cosmantha*. f. 1. *Buchtienii*.

Capitula perspicue radiata, ad anthesin multo majora.

Habitus plerumque perennis, foliis 1–7 cm. longis nunc indivisis nunc tripartitis vel nonnullis etiam 1–3-pinnatis, capitulis pansis ad anthesin plerumque 2–4 rarius usque ad 5.5 cm. latis, achaeniis corpore 0.7–1.4 cm. longis.
B. andicola sensu stricto.

Habitus plerumque perennis, foliis 2–3-pinnatisectis usque ad 1 dm. longis, achaeniis longioribus superne valde attenuato-elongatis.
var. β. *decomposita*.

Habitus plus minusve annuus, foliis ternatisectis, capitulis 1 vel paucis, normaliter radiatis et pansis ad anthesin 6–7 cm. latis.
var. γ. *Cosmantha*.

Habitus perennis, foliis plerumque indivisis, anguste vel late oblongo-linearibus, interdum 1–5-lobatis vel 3–5-partitis, segmentis linearibus; achaeniis parvis.....var. δ. *tarijensis*.

Habitus perennis, omnibus foliis pinnatim divisis segmentis elongatis tenuiterque linearibus, achaeniis parvis.
var. δ. *tarijensis* f. 1. *dissecta*.

Herba perennis, semi-procumbens vel etiam erecta, valde hispido-pubescens vel fere glabra, ramosa; caulibus parce angulatis, 2–6 (rarius –8 vel etiam usque ad 13 fide Lehmannii) dm. longis. Folia 1–7 cm. longa, valde polymorpha; nunc indivisa, ovata, serrata, sessilia vel alato-petiolata, ad apicem obtusa vel subacuta; nunc tripartita vel 1–3-pinnata foliolis ovatis vel lanceolatis vel linearibus et ad apicem sensim vel abrupte apiculatis. Capitula ramos terminantia, longe pedunculata, radiata, pansa ad anthesin 2–4 vel rarius etiam usque ad 5.5 cm. lata, 0.7–1.4 cm. alta. Involucrum perspicue hispidum; bracteis exterioribus 8–10, lanceolatis vel lineari-oblongis, ciliatis, supra saepe glabratis, apice plerumque obtusis, 5–6.5 mm. longis, quam interioribus lanceolatis dense hispidis plerumque multo brevioribus. Flores ligulati saepius 8, lutei, ligula elliptico-oblanceolati, apice plerumque minute 3-denticulati, 1.2–2.5 cm. longi. Achaenia tenuiter linearia, inferne sensim attenuata, obcompresso-quadrangularia, sulcata, supra plus minusve erecto-hispida, fusconigra, corpore 0.7–1.4 cm. longa et 0.4–1 mm. lata et paleas demum superantia, apice bi- (vel pauca tri-) aristata, aristis tenuibus, brunneo-stramineis vel rubescentibus, retrorsum hamosis, 1.7–3 mm. longis.

Type specimen: Collected by *Alexander Humboldt* and *Aimé Bonpland* at altitude of 3,150 meters, on slope of Mt. Chimborazo, Ecuador, June, 1799–1804 (Par.).

Distribution: Region of the Andes from Colombia southward through Ecuador, Peru, and Bolivia into northern Argentina.

Specimens examined: *J. Ball*, rocky places, alt. 3,600–3,900 meters, Chicla, Peru, April 21–23, 1882 (Gray); *Miguel Bang* 16 pro parte, alt. 3,000 meters, La Paz, Bolivia, 1889 (Berl.; Boiss.; Del., 2 sheets; Gray; Kew, cum *B. pilosa* var. *radiata* commixta; Mo.; Mus. V.); *idem* 141, eodem loco, 1890 (Berl.; Boiss.; Brit.; Cop.; Field; Gray; Kew; Mo.; Mun.; Mus. V.; Phila., etc.); *Aimé Bonpland* 3125, equatorial America (Par., sub nom. *Coreopside patula* Willd. mss.); *Thomas Bridges*, Bolivia (Brit.); *Otto Buchtien*, alt. 3,700 meters, on hills, La Paz, Bolivia, February 5, 1907 (Berl.); *idem*, alt. 3,750–3,800 meters, eodem loco, February, 1919 (Field, 2 sheets); *idem*, alt. 3,750 meters, eodem loco, March 6, 1919 (Field); *idem* 23, on hills and mountain slopes, alt. 3,700 meters, eodem loco, March, 1910 (Berl.; Del., 2 sheets; Field; Gray); *idem* (similiter) 23, alt. 3,200 meters, Unduavi, North Yungas, Bolivia, February, 1914 (Field; forma *B. triplinerviae* var. *macranthae* adpropinquans); *idem* 98, alt. 3,750 meters, dry hillsides, La Paz, Bolivia, May 18, 1907 (Field); *idem* 205, alt. 3,200 meters, hills, Unduavi, North Yungas, February 12, 1907 (Field); *idem* 260, alt. 3,750 meters, hills, La Paz, April 18, 1907 (Field); *idem* 261, alt. 3,700 meters, eodem loco, February 5, 1907 (Field); *idem* 732, alt. 3,700 meters, eodem loco, February 5, 1907 (Field); *idem* 1462, La Paz, February 5, 1907 (Gray; Mun.); *idem* 3072, alt. 3,300 meters, mountain slopes, Unduavi, North Yungas, November, 1910 (Field; U.S.; forma *B. triplinerviae* var. *macranthae* adpropinquans); *idem* 3073, alt. 3,200 meters, eodem loco, February 12, 1907 (Field; forma *B. triplinerviae* var. *macranthae* adpropinquans); *idem* 4305, alt. 3,750 meters, La Paz, April 8, 1919 (Field; Gray; U.S.); *idem* 4306, eodem loco et tempore (Field; Hamb.); *Gaudichaud* (*Voyage la Bonite*) 1046, Purruchuca, Peru, 1836–1837 (Par., sub nom. *Bidente diffusa*); *Fritz Claren* 11443, alt. 3,650 meters, sandy places, Santa Catalina, Dept. Santa Catalina, Prov. Jujuy, Argentina (Stockh.); *R. E. Fries* 987, alt. 3,300–3,400 meters, subhumid, cultivated places, Yavi, Prov. Jujuy, Argentina, January 1, 1902 (Stockh., 2 sheets); *R. Hauthal* 334, alt. about 3,600 meters, La Paz, Bolivia, 1906 (Berl.); *F. L. Herrara* 2358, alt. 3,600 meters, hills of the Saxaihuamán, Dept. Cuzco, Peru, March, 1929 (Field); *G. Hieronymus & P. G. Lorentz*, vicinity of Nevado del

Castillo, Prov. Salta, Argentina, March 19–23, 1873 (Berl.); *Humboldt & Bonpland*, alt. 3,150 meters, etc. (type, Par.: cotype, Willd., sub herb. No. 15032, fol. 2, et sub nom. *Bidente pubescenti* Willd.); *A. S. Kalenborn* 100*b*, Oroya, Peru (U.S.); *E. P. Killip & A. C. Smith* 21591, alt. 3,000–3,500 meters, on open hillside, Río Blanco, Dept. Lima, Peru, April 15–17, 1929 (Field); *iidem* 21766, eodem loco et tempore (Field); *Otto Kuntze*, Cochabamba, Bolivia, March, 1892 (Mo., sub appellationibus β. and α. *normali*); *idem*, alt. 2,100 meters, Santa Rosa, Bolivia, April 1, 1892 (N.Y., sub nom. *Bidente grandiflora δ. serrulata* O. K.); *F. C. Lehmann*, abundant in swampy places, alt. 3,000 meters, Pasto, Colombia, June 14, 1878 (Mus. V.); *idem* 357, alt. 2,000 meters, Tunguragua, Ecuador, October 31, 1879 (Boiss.); *idem* 2835, alt. 2,600–3,000 meters, Dept. Cauca, Colombia, May 6, 1883 (Gray); *idem* 5977, abundant at alt. 2,500–2,800 meters, on the Alto de Pesares above Popayán, Cauca, Colombia, March (Berl.); *G. Mandon* 43 pro parte, uncultivated slopes at alt. 2,600–2,700 meters, San Pedro, Bolivia, March, 1859 (Berl.; Gray; Kew; N.Y.); *idem* (similiter) 43 pro parte, everywhere, in dry, rocky, uncultivated places, alt. 2,650–3,200 meters, Sorata, Bolivia, February–May, 1859 (Boiss.); *idem* 44 pro parte, San Pedro, Bolivia, March, 1859 (Berl.; Brit.; Del., 2 sheets; Gray; Kew; Mus. V.); *idem* 45 pro parte, alt. 3,200 meters, between Mt. Pocara and Habaya, Sorata, Bolivia, February, 1859 (Brit.); *idem* 46 pro parte, Sorata, (N.Y.); *Mathews* 1046, Cuesta de Purruchuca, Peru (Del., sub nom. *Bidente diffusa*; Kew); *F. W. Pennell* 13555, rocky stream bank, alt. 3,500–3,600 meters, Sacsahuamán, above Cuzco, Dept. Cuzco, Peru, April, 24, 1925 (Field); *idem* 14240, alt. 3,500–3,550 meters, rocky cliff below La Paz, Bolivia, May 19–20, 1925 (Field); *idem* 14730, alt. 3,400–3,600 meters, open, rocky slope, Huaros, Dept. Lima, Peru, June 23, 1925 (Field); *K. Pflanz* 106, alt. 3,100 meters, Palca, La Paz, Bolivia, April, 1908 (Berl.); *idem* 205, alt. 4,300 meters, eodem loco, February, 1908 (Berl.); *idem* 441, Palca, La Paz, April 8, 1910 (Berl.); *idem* 466, alt. 3,650 meters, eodem loco, February 1, 1910 (Berl.); *H. H. Rusby* 1687, alt. 3,000 meters, near La Paz, April, 1885 (N.Y.); *idem* 1688, alt. 3,000 meters, La Paz, October, 1885 (Berl.; Boiss.; Gray; Kew; Mo.; Phila.); *F. Schickendantz* 139, Yacatula, near Belén, Prov. Catamarca, Argentina, 1879–1880 (Berl.); *idem* 200, Capillitas, Prov. Catamarca, February, 1873 (Berl., 2 sheets, 1 sub nom. *Bidente Cosmantha* var. *diversifolia*); *A. Weberbauer* 2506, alt. 3,400–3,600 meters, mountains east of Palca, Dept. Junín, Prov. Tarma, Peru, February 12, 1903 (Berl.);

idem 3057, alt. 3,700 meters, Hacienda Cajabamba (between Samanco and Caraz), Dept. Ancash, Peru, May 24, 1903 (Berl.); *idem* 4854, alt. 3,500–3,600 meters, Sacsahuamán, above Cuzco, Peru, May 24, 1905 (Berl., forma *B. triplinerviae* var. *macranthae* adpropinquans).

For many years the identity of the South American *Bidens andicola* has been obscured by the great multiplicity of foliage forms encountered. Weddell, as early as 1856 (Chloris And. 1: 70) described it as a polymorphous plant ("Plante polymorphe et très repande dans la chaine, mais presque exclusivement alpestre"). Later, Otto Kuntze, who like Weddell had collected in South America, commented upon the variability of the leaves ("Eine robuste Art mit einfach oder mehrfach ternatisecten Blättern, mittelgrossen gelben Strahlblüthen, ziemlich grossen Blüthenköpfen, äusseren zottig behaarten Involucralbracteen, etc., aber in Bezug auf Blattheilung wie manche andere *Bidens*-Art sehr variabel"; Rev. Gen. Pl. 3, pt. 2: 136. 1898). In herbaria the numerous foliage forms are seen to simulate corresponding forms of *B. triplinervia* H.B.K. (*B. humilis* H.B.K., *B. Crithmifolia* H.B.K., etc.), and this has led often to confusion between the two species. Some years ago I was enabled, through the courtesy of Dr. Otto Buchtien (cf. Sherff, Bot. Gaz. 76: 151. 1923), to study a great number of specimens collected by him and displaying a wide range of variation. From these (Field) and many others, totalling more than three hundred specimens, the descriptions for *B. andicola* and its varieties are drawn. It was found that sometimes, in poorly developed material, distinction from *B. triplinervia* or its varieties is apparently impossible, but that in well developed material the distinctions are usually very definite, *B. andicola* being coarser, its thicker heads having commonly about eight instead of commonly about five rays, etc. *B. andicola* has the paleae shorter than the mature achenes and even this character alone separates it from the surprisingly similar aggregation of Mexican forms of *B. triplinervia* (*Purpus* 1547, 1548, 2637, 4135, 5089, 5620; *Rose & Painter* 6666, 7949; *Pringle* 4915; *E. W. Nelson* 3220, etc.) that in late years have passed erroneously under the name *B. Daucifolia* DC. In the latter the paleae are usually very blackish above and commonly surpass the mature achenes.

The type sheet of *B. fruticulosa* Mey. & Walp. in Berlin bears two small specimens collected by Meyen in April, 1831, about Tacora, Peru. The leaves are undivided, ovate to oblanceolate, and only about 1 cm. long, the heads 6–8-ligulate. The plants match very closely a certain form found among the Buchtien plants

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already cited (No. 4305), and thus are seen to be merely an extreme form of *B. andicola*.

As stated in a former article (Bot. Gaz. 85: 2. 1928), Grisebach's *B. Cosmantha* var. *diversifolia* was described as having the lowermost leaves ternatisect, the others entire, elliptic-oblong, sharply serrate. It came from the Province of Catamarca, Argentina. The Catamarca plants studied by Grisebach had been collected by F. Schickendantz (Griseb. op. cit. 3). A good specimen of *F. Schickendantz* 200, from Catamarca and bearing the determination *B. Cosmantha* var. *diversifolia* Griseb., is extant in the Berlin Herbarium. It is merely *B. andicola* H.B.K.

Bidens andicola var. *β.* **decomposita** Kuntze, Rev. Gen. 3, pt. 2: 136. 1898. Pl. CXXIII, figs. *f* and *g*.

Bidens macrantha Griseb. Abhandl. Goett. 19: 138. 1874.

Bidens grandiflora var. *breviloba* Kuntze, loc. cit.

Folia 2–3-pinnatisecta, usque ad 1 dm. longa, achaeniis superne valde attenuato-elongata.

Type specimen: Collected by *Otto Kuntze*, at altitude of 3,000 meters, Cochabamba, Bolivia, March 26, 1892 (N.Y.).

Distribution: From Ecuador southward through Peru and Bolivia into Argentina, where it extends as far south as the provinces of Mendoza, San Luis, and Córdoba.

Specimens examined: *J. Ball*, rocky places, alt. 3,600–3,900 meters, Chicla, Peru, April 21–23, 1882 (Kew, ubi secundum specimen species ipsa est); *idem*, alt. 4,200–4,290 meters, above Casapalta, Peru, April 22, 1882 (Kew); *idem*, alt. 1,800–3,300 meters, in valley of Rímac River, Peru, April, 1882 (Kew); *Miguel Bang* 16 pro parte, alt. 3,000 meters, La Paz, Bolivia, 1889 (Del.; Mun.; U.V.); *idem* 141*a*, Bolivia (Cop.; N.Y.); *Thomas Bridges*, Bolivia (Brit.; forma *B. triplinerviae* var. *macranthae* adpropinquans); *Otto Buchtien*, alt. 3,840 meters, Bolivia, March, 1910 (Field); *idem*, alt. 3,750 meters, La Paz, Bolivia, March, 1912 (Brit.); *idem*, eodem loco, March, 1913 (Cop.; Del., 2 sheets; Field; Gray; Kew; Mo.); *idem*, alt. 3,800 meters, eodem loco, February, 1919 (Field); *idem* 150, alt. 3,750 meters, eodem loco, March, 1913 (Field); *idem* 377, eodem loco, February 2, 1919 (Field); *idem* 812, eodem loco et tempore (Field, 2 sheets); *idem* 3066, eodem loco, March, 1910 (N.Y.); *idem* 3067, alt. 3,700 meters, hills, La Paz, March, 1910 (Field); *idem* 4301 et 4302, alt. 3,750 meters, La Paz, February 2, 1919 (Field; U.S.); *idem* 8562, alt. 3,750 meters, eodem loco, February 13, 1931 (Field); *idem*

8563, alt. 3,850 meters, eodem loco et tempore (Field); *idem* 8660, alt. 3,800 meters, eodem loco, April 25, 1931 (Field); *Cárdenas* "68 special," alt. 3,300 meters, La Paz, Bolivia, May 7, 1922 (N.Y.); *K. Fiebrig* 3004, South America (Berl.); *idem* 3032*b*, alt. 3,600 meters, Escayache near Tarija, Bolivia, January–February, 1904 (Stockh.); *C. Galander*, Pampa del Matadero, Argentina, January 22, 1880 (Berl.); *idem*, ravine, at foot of Los Gigantes, Sierra Achala, Prov. Córdoba, Argentina, January 23, 1880 (Berl.); *idem*, ravine, eodem loco, January 24, 1880 (Berl.); *idem*, Estancia de las Rosas, Prov. Córdoba, January 27, 1881 (Berl.); *idem*, Cuesta de San Ignacio, Argentina, March 23, 1881 (N.Y.); *idem*, Sierra de la Estanzuela, Prov. San Luis, Argentina, March 3, 1882 (Berl.); *idem*, ravine of los Bueyes near San Francisco, Prov. San Luis, March 17, 1882 (Berl.); *idem*, Cerro del Morro, Prov. San Luis, March 22, 1882 (Berl.); *F. L. Herrera* 1482*a*, alt. 3,350 meters, Cuzco, Peru, March, 1927 (Gray); *G. Hieronymus*, Paso de la Higuera at foot of the Cuesta de Arpel, Sierra Achala, Prov. Córdoba, Argentina, March 24–25, 1874 (Berl.); *idem*, Sierra Achala, north from the Cuesta de Copina, Argentina, February 19, 1877 (Berl.); *idem* 431, Cerro de Orcosu, Dept. Las Minas, Prov. Córdoba, Argentina, February 20, 1876 (Berl.; Kew, ubi glabra et mexicanae *B. serrulatae* plus minusve adpropinquans); *idem & P. G. Lorentz* 147, Los Potreros at foot of Nevado del Castillo, Prov. Salta, Argentina, March 24, 1873 (Berl., forma tantum 5- vel 6-radiata); *iidem* 172, eodem loco, March 18, 1873 (Berl.; forma floribus ligulatis deficientibus vel minimis); *A. S. Hitchcock* 20785, alt. 3,000 meters, open slopes, La Rinconada, a ranch between Ibarra and Tulcán, Prov. Carchi, Ecuador, August 10–11, 1923 (N.Y.); *P. Jörgensen* 1363 pro parte, Dept. Andalgalá, Prov. Catamarca, Argentina, February 16, 1917 (U.S.; in Herb. Calif. hic numerus species ipsa est); *A. S. Kalenborn* 100, alt. 3,000–4,200 meters, dry hills, Oroya, Peru (U.S.); *idem* 100*a*, Oroya (U.S.); *Margaret Kalenborn* 100, alt. 3,000–5,100 meters, Oroya, 1919 (Mo.); *E. P. Killip & A. C. Smith* 24229, alt. 1,800–2,400 meters, open hillside, Huacapistana, Dept. Junín, Peru, June 6–8, 1929 (Field); *P. G. Lorentz*, Tucumán, Argentina (Kew; commun. Grisebach sub nom. *B. macrantha* Griseb.); *idem* 152 and 152*a*, Sierra de Tucumán, La Ciénaga, Prov. Tucumán, Argentina, March 25–31, 1872 (Berl.); *idem* 188, meadows, etc., Ascodringa, Argentina, April, 1871 (Berl.); *idem* 318, La Ciénaga, Argentina (Berl.); *Macbride & Featherstone* 441, grassy hilltop, Matucana, Peru, April 12–May 3, 1922 (Field); *Hans Meyer* 61, alt. 4,200–4,300 meters, páramo region, Mt. Chimborazo,

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Ecuador, 1903 (Berl.); *K. Pflanz* 406 p.p., alt. 3,550 m., Palca, La Paz, Bolivia, March 13, 1910 (Berl.); *E. C. Reed* 142, Mendoza, Argentina (Kew); *H. H. Rusby* 1686, near La Paz, Bolivia, April, 1885 (N.Y.); *C. S. Sargent* 26, above Chicla, Peru, December 26, 1905 (U.S.; forma); *F. Schickendantz* 201, Negrilla, Prov. Catamarca, Argentina, February, 1873 (Berl.); *A. Weberbauer* 275, alt. 4,400 meters, near Lima, Peru, January 18–27, 1902 (Berl.).

Occasionally a form of *B. andicola* is found with the leaves highly compound and the achenes strongly narrowed above, somewhat like those of *Cosmos*. If it were not for various connecting forms this would seem to be specifically distinct. Kuntze, who collected specimens of it, referred at least one of them, a plant from Cochabamba, Bolivia (N.Y.) to *B. andicola*, naming it var. *decomposita*. In a careless moment he named a precisely identical form collected between Cochabamba and Río Juntas, Bolivia (N.Y.) *B. grandiflora* var. *breviloba*, although *B. grandiflora* (=*B. serrulata*) is a Mexican species not known to occur in South America.

To Kuntze's variety *decomposita* must be referred *Bidens macrantha* Griseb., founded on a plant by P. G. Lorentz, No. 316, alpine pastures near La Ciénaga, Argentina. The type is extant in good condition (Berl.). Although lacking mature achenes, it matches very closely the Bolivian specimens of var. *decomposita*, except in the unimportant respect that it has somewhat larger rays.

Bidens andicola var. γ. **Cosmantha** (Griseb.) Sherff, Bot. Gaz. 85: 2. 1928. Pl. CXXIII, fig. *e* and Pl. CXXIV.

Bidens Cosmantha Griseb. Goett. Abhandl. 19: 137. 1874.

Caules altiores et graciliores, mono- vel paucicephali, foliis ternatisectis; segmentis supra basim argute serratis acutis, lateralibus sessilibus duplo brevioribus ovatis, terminali oblongo-lanceolato basi cuneato et secus petiolum decurrente, capitulis longe pedunculatis, normaliter radiatis et pansis ad anthesin 6–7 cm. latis.

Type specimen: Collected by *Paul Guenther Lorentz*, No. 1526, Sierra de Tucumán, La Ciénaga, Province of Tucumán, Argentina, March 25–31, 1872 (Berl.).

Distribution: From central western Bolivia (La Paz) southward to the provinces of Catamarca and Tucumán in northern Argentina.

Specimens examined: *Otto Buchtien* 813, alt. 3,750 meters, La Paz, Bolivia, March 6, 1919 (Field; Gray; Hamb.); *idem* 8477, alt. 3,750 meters, La Paz, January 22, 1931 (Field); *idem* 8561, alt. 3,750 meters, La Paz, February 13, 1931 (Field); *idem* 8564, alt. 3,900

meters, La Paz, February 24, 1931 (Field); *P. G. Lorentz* 540 and 540*b*, Granadillas near Yacatula (near Belén), Prov. Catamarca, Argentina, beginning of February, 1872 (Berl.); *idem* 1526 (type, Berl.).

Grisebach's type of *B. andicola* var. *Cosmantha* was *P. G. Lorentz* 1526, La Ciénaga, etc. Identical material was collected by Lorentz under Nos. 540 and 540*b* (Granadillas near Yacatula, etc.). These Lorentz specimens are connected with *B. andicola* H.B.K. by too many intermediate forms to permit their being regarded as specifically distinct. They may best be considered as a variety of *B. andicola*, more or less distinguished from the species proper by the tall, slender habit, by the leaves more dissected (but less so than in var. *decomposita* O. Ktze.) and with outlines suggesting those of celery (*Apium graveolens* L.), also by the (typically) larger flowering heads, which when fully expanded reach a diameter of 6–7 cm.

Bidens andicola var. γ. **Cosmantha** f. 1. **Buchtienii** (Sherff), comb. nov. Pl. CI, figs. *a–g*.

Bidens Buchtienii Sherff, Bot. Gaz. 76: 150. 1923.

A var. capitulis discoideis vel interdum radiatis (radiis 4 vel 5 minimis rudimentariis atro-flavis) differt.

Type specimen: Collected by *Otto Buchtien*, No. 4304, at altitude of 3,800 meters, La Paz, Bolivia, April 8, 1919 (Field, 2 sheets).

Distribution: Known only from type locality of La Paz and vicinity, Bolivia.

Specimens examined: *Miguel Bang* 16 pro parte, alt. 3,000 meters, La Paz, 1889 (Mun.); *Otto Buchtien*, alt. 3,670 meters, La Paz, April, 1913 (Brit.; Cop.; Del.; Hamb.; Mo.; N.Y.); *idem* 708, alt. 3,750 meters, eodem loco, February 27, 1907 (Field; N.Y.); *idem* 814, alt. 3,750 meters, eodem loco, March 6, 1919 (Field, 2 sheets; Gray, 2 sheets; Hamb.); *idem* 4303*a* and *b*, alt. 3,800 meters, eodem loco, March 23, 1919 (Field); *idem* 4304 (2 type sheets, Field); *idem* 8226, alt. 3,600 meters, region of Tembladerani, La Paz, March 26, 1931 (Field); *idem* 8474, alt. 3,500 meters, lower half of San Jorge, La Paz, December, 1930 (Field); *idem* 8475, alt. 3,800 meters, La Paz, December 19, 1930 (Field); *idem* 8476, alt. 3,800 meters, eodem loco, January 17, 1931 (Field); *idem* 8548, alt. 3,800 meters, eodem loco, February 24, 1931 (Field); *idem* 8549, alt. 3,800 meters, eodem loco et tempore (Field); *idem* 8550, alt. 3,800 meters, eodem loco et tempore (Field); *idem* 8551, alt. 3,800 meters, eodem loco, February 20, 1931 (Field); *idem* 8553, alt. 3,600 meters, eodem loco, February 18, 1931 (Field); *idem* 8621, alt. 3,750 meters, eodem loco, March 6, 1931

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(Field); *idem* 8622, alt. 4,000 meters, eodem loco, March 15, 1931 (Field); *idem* 8624, alt. 3,850 meters, eodem loco et tempore (Field); *idem* 8625, alt. 3,850 meters, eodem loco et tempore (Field); *idem* 8627, alt. 3,600 meters, eodem loco, March 26, 1931 (Field).

In 1916, Otto Buchtien, the eminent South American collector, courteously undertook to secure for me as wide a range as possible of specimens of *Bidens* from South America. His collections since then, as well as his earlier collections, all mainly from Bolivia and Chile, have been received and deposited in the Herbarium of Field Museum. Not only do some of them throw great light upon heretofore difficult points as to the variations of certain species, but two of them were found to be apparently new to science. One of these was described under the name *B. pseudocosmos*. The other was at first regarded as representing a new species, *B. Buchtienii*. Studies of the more recently collected specimens have shown indubitably that the *B. Buchtienii* plants are merely a subligulate form of *B. andicola* var. *Cosmantha*.[1]

Bidens andicola var. δ. **tarijensis** Sherff, Bot. Gaz. 85: 14. 1928.

Folia plerumque indivisa, anguste vel late oblongo-linearia, interdum 1–5-lobata vel 3–5-partita, segmentis linearibus.

Type specimen: Collected by *Karl Fiebrig*, No. 3460, Tarija, Bolivia, March 9, 1904 (Berl.).

Distribution: Southern Bolivia.

Specimens examined: *Fiebrig* 3004*a* pro parte, Tarija, in 1904 (Berl.); *idem* 3460 (type, Berl.); *idem* 3461 pro parte, alt. 3,200 meters, Calderillo, March 22, 1904 (Berl.).

The specimens cited for the var. *tarijensis* (and its f. *dissecta*, below) come from the little known territory in the extreme southern part of Bolivia, close to the Argentine boundary. They are graceful, mostly glabrous plants, growing up to a meter in height. They have a habit more characteristic of *B. triplinervia* H.B.K. (with which they were at first confused by me), but the heads are rather uniformly 8-rayed, as in *B. andicola*. The variety proper is seen to be comparable with the var. *hirtella* of *B. triplinervia*. In var. *tarijensis*, however,

[1] Recently Buchtien has reported (in lit. March 27, 1932) that *B. andicola* (meaning var. *Cosmantha* in particular) has rays often 4 cm. long, but usually 3 cm., and as short as 2 cm. only on very dry spots of ground. He reports further that the *Buchtienii* forms are always radiate but with rays only 2–3 mm. long. He has "never seen plants which form a transition from the one to the other." For practical purposes of identification, it may be remarked that dried herbarium specimens of f. *Buchtienii* often appear entirely discoid.

there is observed the very strong tendency to produce a form with the leaves divided into 3–5 elongate-linear segments. This form (f. *dissecta*) is very different in general habit from other known forms of *B. andicola* with compound leaves.[1]

Bidens andicola var. δ. **tarijensis** f. 1. **dissecta** Sherff, Bot. Gaz. 85: 14. 1928.

E var. *tarijensi* ipsa omnibus foliis pinnatim divisis segmentis elongatis tenuiterque linearibus differt.

Type specimen: Collected by *Karl Fiebrig*, No. 3147, at altitude of 2,200 meters, Tarija, Bolivia, March 13, 1904 (Berl.).

Distribution: Southern Bolivia.

Specimens examined: *Fiebrig* 3004*a* pro parte, Tarija, 1904 (Berl.); *idem* 3147 (type, Berl.); *idem* 3461 pro parte, alt. 3,200 meters, Calderillo, March 22, 1904 (Berl.).

Bidens andicola var. ε. **Mandonii** Sherff, Bot. Gaz. 80: 380. 1925.

A specie differt: saepius annua, altior (usque ad 8 vel 10 dm. alta), minus ramosa et magis attenuata; capitulis ad anthesin subradiatis, minoribus, tantum circ. 5 mm. latis et 5–7 mm. altis, achaeniis gracilioribus.

Type specimen: Collected by *Gustave Mandon*, No. 48, in uncultivated places at altitude of 2,650–2,680 meters, San Pedro, Bolivia, March, 1859 (Boiss.).

Distribution: Bolivia and northernmost Argentina.

Specimens examined: *Otto Buchtien* 9105, alt. 3,200 meters, Unduavi, North Yungas, Bolivia, October, 1931 (Field); *P. G. Lorentz & G. Hieronymus*, cattle ranches at foot of Nevado del Castillo, Prov. Salta, Argentina, March 19, 1873 (Berl., 2 sheets); *Mandon* 44 pro parte, San Pedro, Bolivia, March, 1859 (Boiss.; Mus. V.); *idem* 48 (type, Boiss.: cotypes, Brit.; Kew).

Mr. Gustave Beauverd, in 1919, had referred my type doubtfully to a variety of *B. pilosa* L. The fruiting heads, however, are more those of *B. andicola*. *Mandon* 44, collected at the same time and place, offers several transitional forms that connect this variety satisfactorily with typical *B. andicola*. In fact, the Boissier Herba-

[1] We may note an instructive specimen, *K. Fiebrig* 3459, alt. 2,800 meters, Tarija, Bolivia, March 22, 1904 (Berl.). This was collected the same day as the Calderillo plants (No. 3461), at a slightly different altitude in a nearby locality. Its leaves are tripartite and more as in normal forms of *B. andicola*.

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rium specimen of *Mandon* 44 and one in the Natural History Museum at Vienna are closer to the variety than to the species proper.

EXPLANATION OF PLATE CI, FIGS. *a–g*

Bidens andicola var. *Cosmantha* f. *Buchtienii: a,* fruiting branch, ×0.62; *b,* exterior involucral bract, ×2.48; *c,* interior involucral bract, ×2.48; *d,* palea, ×2.48; *e,* disc floret, ×4.96; *f* (outer), *g* (inner), achenes, ×2.48; all from type.

EXPLANATION OF PLATE CXXIII

Bidens andicola, figs. *a–d, h–p: a,* flowering and fruiting branch, ×0.65; *b,* pair of leaves, ×0.65; *c, d,* more compound leaves, ×0.65; *h,* lower surface of portion of leaf enlarged to show pubescence, ×2.62; *i,* exterior involucral bract, ×3.27; *j,* interior involucral bract, ×3.27; *k,* portion of *j,* enlarged to show multiloculate hairs, ×44.78; *l,* ray floret, ×2.62; *m,* palea, ×3.27; *n,* disc floret, ×4.58; *o* (outer), *p* (inner), achenes, ×4.58; *a, h–p,* from *Buchtien* 732, in Hb. Field; *b,* from *Buchtien* 4305 (matching type of *Bidens fruticulosa* Walp.), ibid.; *c,* from type; *d,* from *Bang* 16, in Hb. Berl.

Bidens andicola var. *decomposita,* figs. *f, g:* cauline leaves, ×0.65; *f,* from *Buchtien* 377, in Hb. Field; *g,* from *Buchtien,* alt. 3,800 meters, La Paz, Bolivia, February, 1919, ibid.

Bidens andicola var. *Cosmantha,* fig. *e:* cauline leaf, ×0.65; from *Buchtien* 813, in Hb. Field.

EXPLANATION OF PLATE CXXIV

Bidens andicola var. *Cosmantha: a,* flowering and subfruiting specimen, ×0.68; *b,* separate leaf, ×0.68; *c,* exterior involucral bract, ×3.38; *d,* interior involucral bract, ×3.38; *e,* ray corolla, ×1.35; *f,* palea, ×3.38; *g,* disc floret, ×3.38; *h,* immature achenes, ×4.05; *a,* from type; *b–h,* from *Lorentz* 540*b,* in Hb. Berl.

149. **Bidens microphylla** Sherff, Bot. Gaz. 90: 390. 1930. Pl. CXXV.

Coreopsis pulchella O. Hoffm. Bot. Jahrb. 38: 204, *pl. 3.* 1906; et Engler, Pflanzenw. Afrikas 1, pt. 1: 155, *pl. 124.* 1910.

Herba prostrata, verisimiliter perennis, ramosa, ramis gracillimis infra sparsissime supra valde pilosis foliosis, speciminibus visis tantum 1–1.5 dm. longis, nodis majoribus radicantibus, internodiis 0.5–2.5 cm. longis. Folia minima, tenuiter petiolata petiolis basi dilatatis parce pilosis 2–5 mm. longis petiolo adjecto tantum 8–10 mm. longa, lamina deltoidea membranacea subglabra tripartita

segmentis rhomboideo-ovatis iterum 2–5-fidis, laciniis acutis vel apiculatis. Capitula solitaria ramos terminantia pedunculis tenuibus ± 1.5 cm. longis, radiata, pansa ad anthesin 1.2–1.6 cm. lata et 6–7 mm. alta. Involucri bracteae aequilongae (circ. 4 mm.), exteriores 5–7 carnosulae glabrae spathulatae apicem versus rotundatae et apice ipso minute mucronulatae, interiores late ellipticae membranaceae puberulae. Flores ligulati circ. 5, aurei, ligula oblongi, apice submucronulati, 7–8 mm. longi et 3–4 mm. lati. Disci florum stigmata terminaliter angustata. Achaenia anguste obovoidea, obcompressa, exalata, margine parce ciliata, apice obtuso vel truncato calva vel bidenticulata, 2–2.5 mm. longa et ± 0.5 mm. lata.

Type specimen: Collected by *Ellenbeck* (*Exped. Baron Von Erlanger*), No. 1370, on rocks at altitude of 3,000 meters, at Abutkasin in the Land of Arussi-Galla, Galla Highland, July 16, 1900 (Berl.).

Distribution: Known only from type locality in Galla Highland.

Specimens examined: *Ellenbeck* 1370 (type, Berl.).

EXPLANATION OF PLATE CXXV

Bidens microphylla: a, b, flowering branches, ×0.62; *c,* view from below of flattened involucre, ×4.31; *d,* ray corolla, ×4.93; *e,* palea, ×4.93; *f,* disc floret, ×6.16; *g,* achene, ×4.93; all from type, but *a* and *b* drawn partly with aid of type plate.

150. **Bidens triplinervia** H.B.K. Nov. Gen. et Sp. 4: 182 (231). 1820. Pl. CXXVI, figs. *j, k.*

Bidens affinis Klotzsch & Otto, Linnaea 15: 2. 1841; Literatur-Bericht 83. 1841.

Bidens pedunculata Phil. Anal. Mus. Nac. Chile Bot. 1891: 49. 1891 (ex descript. et patr.); *B. pedunculosa* Phil. ex Ind. Kew Suppl. 1: 56. 1906 (sphalm).

a. Folia plerumque indivisa.

b. Folia ovato-lanceolata.....*B. triplinervia* sensu stricto.

b. Folia linearia vel lineari-lanceolata.....var. β. *hirtella.*

a. Folia plerumque 1–3-pinnata.

b. Folia normaliter tripartita saepius molliter pubescentia.
var. δ. *mollis.*

b. Folia variabiliter pinnato-quinquepartita, bipinnata vel etiam tripinnata.

c. Segmenta ultima linearia 0.5–3 mm. lata.

d. Flores ligulati plerumque 5 vel 6.
var. γ. *macrantha* sensu stricto.

BIDENS PHALANGIPHYLLA Sherff (figs. *a–h*)
BIDENS ELLIOTII (S. L. Moore) Sherff (figs. *i–p*)

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d. Flores ligulati circ. 8....var. γ. *macrantha* f. 1. *octoradiata.*

c. Segmenta ultima flagellaria plerumque circ. 0.3–0.6 mm. lata. var. ε. *nematoidea.*

Herba perennis, diffusa, gracilis, glabra vel sparsim pubescens; caulibus saepe numerosis, simplicibus vel inferne ramosis, procumbentibus vel adscendentibus, angulatis, 1–3.5 (–7) dm. longis. Folia petiolata petiolis 0.5–1.5 cm. longis, petiolo adjecto plerumque 1.5–4 cm. longa, indivisa, ovato-lanceolata, serrata. Capitula terminalia, solitaria, longe tenuiterque pedunculata pedunculo 0.3–1.5 dm. longo, radiata, pansa ad anthesin 5–8 mm. alta et 1.5–2.5 cm. vel etiam usque ad 6 cm. lata, cum fructu demum 7–10 mm. alta et 0.7–1.4 cm. lata. Involucrum glabrum vel hispidum; bracteis exterioribus (5–9) quam interioribus paulo brevioribus, linearibus, obtusis, 3–7 mm. longis. Flores ligulati plerumque 5, flavi, ligula oblongo-elliptici, apice tridenticulati, 1–3 cm. longi. Achaenia linearia, quadrangularia, nigrescentia, supra scabriuscula vel sparsim hispida, bi- vel triaristata, corpore 6–9 mm. longa, aristis retrorsum barbatis, 0.7–2 mm. longis.

Type specimen: Collected by *Alexander Humboldt* and *Aimé Bonpland*, at altitude of 2,106 meters, near San Agustín de Las Cuevas and the City of Mexico, State of Mexico, Mexico, 1803–1804 (Par.).

Distribution: Southern Mexico, Guatemala, Colombia, and Ecuador; very rare, being usually represented by one of its varieties.

Specimens examined: *Ed. André* 556, Facatativá, Colombia (Kew); *Anon.* (communic. *R. A. Philippi*, February, 1888), Tarapacá, Chile (Kew, sub nom. *Bidente macropa* Phil.); *O. F. Cook & G. B. Gilbert* 703, alt. about 3,000 meters, Ollantaitambo, Peru, May 13, 1915 (U.S.; monstrosum); *Rosalío Gómez* 1074, alt. 1,950 meters, Santiago, Dept. Zacatepéquez, Guatemala, 1891 (Kew); *Justin Goudot*, ditches, Fontibón, Prov. of Bogotá, Colombia, February 20, 1844 (Par.); *idem*, Guadalupe, Bogotá, Colombia, March, 1844 (Webb); *Hort. Argentorati*, Strasburg, Alsace, August, 1841 (Herb. Schz. Bip. in Par.); *Hort. Berol.*, October, 1833 (Berl., 2 sheets); *idem*, 1840 (Berl.); *idem*, e seminibus mexicanis, August, 1840 (Berl.); *idem*, September, 1840 (Berl.); *Humboldt & Bonpland*, alt. 2,106 meters, etc. (type and cotype, Par.); *E. P. Killip & Albert C. Smith* 17405, alt. 3,400–3,700 meters, Páramo de Vetas, Dept. Santander, Colombia, January 16, 1927 (U.S.); *iidem* 18212, alt. 3,500–3,700 meters, Páramo de Las Puentes, above La Baja, Dept. Santander, Colombia, January 25, 1927 (U.S.); *E. W. Nelson* 3656, alt. 3,300 meters, mountains near Hacienda Chaucol, Guatemala, January 2,

1896 (U.S.; forma foliis late ovatis);[1] *C. A. Purpus* 5089 pro parte, El Chico, Hidalgo, Mexico, September, 1905 (Calif.; cum var. *macrantha* lecta); *J. N. Rose & R. Hay* 6039 pro parte, Mt. Popocatapetl, Mexico, August 7–8, 1901 (U.S.; forma foliis rotundato-ovatis, cum var. *macrantha* lecta); *C. J. W. Schiede*, near Angangueo, Michoacán, Mexico, October (Berl., 2 sheets); *J. D. Smith* 2375, alt. 300 meters, San Luis, Dept. Escuintla, Guatemala, April, 1890 (Phila.); *A. Stübel* 54*a*, Cerro Colocachi, Prov. Imbabura, Ecuador, November–December, 1870 (Berl.); *idem* 143 pro parte, alt. 3,700–3,800 meters, Páramo de Pasca, Dept. Cundinamarca, Colombia, June, 1868 (Berl., 2 sheets; cum var. *macrantha* commixt.; nom. vulg., ñacha); *J. Triana* 1375, alt. 2,700 meters, Prov. Bogotá, Colombia, 1851–1857 (Par.).

Bidens affinis Kl. & O. was described from specimens raised from seed sent by E. Otto. A number of good specimens are in the older herbaria (Herb. Bernhardi in Mo.; Mus. V.; Par.; etc.). Specimens obtained in August, 1841, at the Strasburg Botanical Garden (Hort. Argent.) and elsewhere from seed sent from Berlin (where Klotzsch was Keeper of the Royal Herbarium, fide Pritzel, Thes. 165. 1872) are in the private herbarium of Schultz Bipontinus (Par.). These were determined by him as *B. triplinervia* H.B.K. O. E. Schulz (in Urban, Symb. Antill. 7: 143. 1911) likewise equates *B. affinis* with *B. triplinervia*. In 1914 I compared the *B. affinis* specimens with the type and *Bonpland* duplicate of *B. triplinervia* (Par.) and found them identical.[2]

Asa Gray (Proc. Amer. Acad. 22: 429–430. 1887) suspected *B. triplinervia* of being a form of *B. heterophylla* Ort.; i.e., of *B. aurea* (Ait.) Sherff. The two species do actually resemble each other in

[1] Here may be mentioned *C. G. Pringle* 7895, alt. 2,850 meters, Sierra de Pachuca, Hidalgo, Mexico, September 14, 1899 (U.S.); *idem* 7908, alt. 3,000 meters, eodem loco, October 6, 1899 (Gray); *idem* 8255, eodem loco, October 5, 1899 (Berl.; Boiss.; Brit.; Can.; Carn.; Del.; Field; Gray; Kew; Mun.; Mus. V.; Par., 2 sheets; Petrop.; Phila.; U.S., etc.). These are tall, robust forms, appearing at first as if abnormal forms of *Bidens serrulata*. Most of the specimens have simple leaves and these vary greatly in outline (from ovate-lanceolate to rotund) and hispidity (densely hispid to glabrous). No. 7908 has the ovate, simple leaves very incisely toothed with about 5–7 long teeth on each side, giving the same pectinate appearance noted by Schultz Bipontinus in certain specimens of *Mandon* 50 from Bolivia. In a number of cases, however, the foliage is fairly typical for *B. triplinervia*.

Whether the bizarre vegetative variations observed among these Pringle plants from the upper slopes of Sierra de Pachuca are indicative of hybridization with one or two neighboring species can only be surmised at this time.

[2] The Berlin Herbarium contains the two sheets, already cited, of fine material collected near Angangueo, Michoacán, Mexico, October, by *Schiede*, also several garden specimens cultivated in 1833 at Berlin, doubtless from seed of the Schiede specimens.

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their simple-leaved states, but *B. triplinervia's* longer achenes are very distinctive.

Bidens pedunculata Phil. was based upon *Frederick Philippi* 217, Sibaya, Province of Tarapacá, Chile. I have not seen the type, although the first above cited specimen, from Tarapacá, may be from the original collection. Reiche (Fl. Chile 4: 102. 1905), who without doubt has studied the type, equates *B. pedunculata* with *B. serrata* Pav., but this latter has more slender leaves than called for by Philippi's description ("foliis inferioribus . . . . ovato-lanceolatis") and is better referred to var. *hirtella.*

Bidens triplinervia var. *β.* **hirtella** (H.B.K.) Sherff, Bot. Gaz. 85: 13. 1928; cf. Bot. Gaz. 80: 383 and *pl. 21.* 1925. Pl. CXXVII.

Bidens hirtella H.B.K. Nov. Gen. et Sp. 4: 182 (232). 1820.

Bidens procumbens H.B.K. loc. cit.

Bidens serrata Pav. ex DC. Prodr. 5: 597. 1836.

E specie foliis linearibus vel lineari-lanceolatis differt.

Type specimen: Collected by *Alexander Humboldt* and *Aimé Bonpland*, probably at Quito, Ecuador, 1799–1803 (Par.).

Distribution: Colombia, Ecuador, and Peru.

Specimens examined: *Bro. Ariste-Joseph A*42, Bogotá, Colombia, 1916 (U.S.); *M. T. Dawe* 302, sabana or plain of Bogotá, Colombia, communic. 1916 (Kew); *Humboldt & Bonpland*, probably at Quito, Ecuador, 1799–1803 (types of *Bidens hirtella* H.B.K. and *B. procumbens* H.B.K.; Par.); *iidem*, Quito, eodem tempore (Par.); *Ruiz, Pavón*, and *Dombey* 977, Peru, 1788 (Del.; type of *Bidens serrata* Pav. ex DC.); *J. Triana* 1374 pro parte (Par., cum var. *macrantha* commixt.).

The type locality of *B. hirtella* H.B.K. and of *B. procumbens* H.B.K. was not definitely known to Kunth. In the case of the former, he surmised (H.B.K. loc. cit.) that the plant had grown with *B. triplinervia* H.B.K., which was known to have been collected in Mexico ("prope San Augustin de Las Cuevas et urbem Mexici"). In the case of the latter, he surmised that it had grown near Jalapa ("Xalapa"), Mexico. An extra sheet of original material matching the type of *B. hirtella* and of the identical *B. procumbens* was in the Bonpland Herbarium, which was given later to the Paris Herbarium. This was clearly of the same collection as the two types mentioned. It had been labeled (by Spach, fide L. Anfrayi coram me in mense

Augusto anno 1914) *B. procumbens*, and had come from Quito, Ecuador. Without doubt the types of *B. hirtella* and of *B. procumbens*, which had upon their labels no data as to locality (except "Amérique Equatoriale"), came from the same locality, Quito, Ecuador.

In a former paper (Bot. Gaz. 80: 383. 1925), I have treated *B. triplinervia* as having two sets of forms with divided leaves (var. *mollis* and var. *macrantha*), and one set with undivided leaves (the species proper). From this last set may properly be segregated the forms with slender leaves as var. *hirtella*. Kunth described the leaves of this variety as lanceolate, but they are variously linear-lanceolate, widely linear-oblong, or narrowly oblong-lanceolate. The affinity with *B. triplinervia* is evidenced by the mostly 5-rayed heads, which probably alone distinguish the variety from the corresponding var. *tarijensis* of *B. andicola* H.B.K.

To var. *hirtella* must be referred *B. serrata* Pav. ex DC. The type (No. 977 of the Ruiz, Pavón, and Dombey expedition, Peru, in 1788; cf. Lasègue, Mus. Bot. Deless. 244–247. 1845) is extant in the DeCandolle Prodromus Herbarium (Del.). It lacks flowers, as stated by DeCandolle, but has some leaves undivided and lanceolate or narrowly oblong, others somewhat incised or lobed at the base.

Bidens triplinervia var. γ. **macrantha** (Wedd.) Sherff, Bot. Gaz. 80: 383. 1925. Pl. CXXVI, figs. *a–i* and *l–v*, and Pl. CXXVIII, figs. *j–p*.

Bidens Crithmifolia H.B.K. Nov. Gen. et Sp. 4: 183 (234). 1820.

Bidens Delphinifolia H.B.K. loc. cit.

Bidens humilis H.B.K. op. cit. 184 (234). (Non Sessé & Moc.)

Bidens glaberrima DC. Prodr. 5: 601. 1836.

Bidens Artemisiaefolia Poepp. & Endl. Nov. Gen. et Sp. 3: 49. 1845.

Bidens consolidaefolia Turcz. Bull. Soc. Nat. Mosc. 24: 185. 1851; Ann. Bot. Syst. 5: 225. 1858.

Bidens humilis var. *macrantha* Weddell, Chlor. And. 1: 69. 1856.

Bidens humilis var. *major* Schz. Bip. Linnaea 34: 528. 1865–1866 (pro parte, ex num. 52 plantarum Mandonis; nomen subnudum).

Bidens pectinata Schz. Bip. loc. cit. (ex num. 50 plantarum Mandonis; nomen subnudum).

Bidens decomposita Wall. var. *hirsutior* C. B. Clarke, Compos. Ind. 141. 1876.

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Bidens humilis var. *tenuifolia* Schz. Bip. ex Griseb. Symb. Fl. Arg. 198. 1879 (ex syn. *B. humilis* var. *macrantha* et num. 52 et pro parte 46 plantarum Mandonis).

Bidens pilosa var. *discodea* Schz. Bip. em. 6. *decomposita* f. *hirsutior* O. Ktze. Rev. Gen. 1: 322. 1891.

Bidens grandiflora Balb. var. *humilis* (H.B.K.) O. Ktze. op. cit. 3, pt. 2: 136. 1898 (ex syn. H.B.K.).

Bidens attenuata Sherff, Bot. Gaz. 61: 495. 1916.

Folia (raro nonnulla tripartita foliolis lanceolatis ovato-lanceolatisve, serratis vel pectinatim inciso-dentatis) variabiliter pinnato-quinquepartita, bipinnata vel etiam tripinnata, segmentis ultimis linearibus 0.5–3 mm. latis; capitulis normaliter 5- vel 6-radiatis.

Type specimen: Collected by *William Jameson*, No. 55, at altitude of 3,900 meters, on rocks, flowering almost the entire year, Mount Pichincha, Ecuador, January 21, 1856.[1]

Distribution: From northern Chile and central Argentina northward along the Andes to Colombia, thence eastward into Venezuela; also in Guatemala and widely scattered throughout southern Mexico, reaching as far north as the states of Vera Cruz and San Luis Potosí; established as a common weed in the Nilgeri (Nilgiri) Hills region of southwestern British East India.

Specimens examined: *Ed. André* 3952, alt. 4,600 meters, Mt. Chimborazo, Ecuador, July 7, 1876 (Gray); *Virl. d'Aoust* 447, 496, and 605, "Province of San Luis," Mexico, 1851 (Par.); *George Barclay* 2290, wet loam, Puruchucos (Purrochuca), Peru, June, 1838 (Brit.); *Barnes, Chamberlain, & Land* 5 pro parte, along railway below Las Vegas, Vera Cruz, Mexico, September 8, 1906 (Field, cum var. *molli* lecta); *R. H. Beddome* 4510, alt. 2,250 meters, Ooty, India (Brit.); *idem* 4511, a common weed, Nilgiri Hills, India, communic. 1885 (Brit.); *A. G. & Lady Bourne* 4594, hedges around Ootacamund, Nilgiri Hills, India, June 8, 1904 (Kew); *iidem* 4594*A*, 4594*B*, 4594*C*, banks around Ootacamund, July 6, 1904 (Kew: *A*, foliis multum divisis et foliolis tenuibus; *B*, foliis 3–5-partitis; *C*, foliis nunc 3–5-partitis nunc valdius decompositis); *Otto Buchtien*, alt. 3,200 meters, Unduavi, Bolivia, February, 1914 (Field); *C. B. Clarke* 11207, a common weed, alt. 2,250 meters, Ooty, Nilgiri Hills, India, March

[1] The type herbarium is not cited. Good specimens of this number are in the Delessert and Kew herbaria. Each of their several flowering heads has five rays. A third specimen examined (Brit.) has one head 7-rayed but otherwise matches precisely.

23, 1870 (Kew; type of *Bidens decomposita* var. *hirsutior* C. B. Clarke); *O. F. Cook & G. B. Gilbert* 409, alt. about 3,000 meters, Ollantaitambo, Peru, April 27, 1915 (U.S.); *Thomas Coulter* 381, Real del Monte, Hidalgo, Mexico (Kew); *J. P. Couthouy*, Andes, Ecuador, 1855 (Gray; Phila.); *Ernié Cuming*, State of Oaxaca, Mexico, 1859 (Del., 2 sheets; Par., 2 sheets); *idem* 53, eodem loco et tempore (Del.; Par.; forma olim pro specie *B. attenuata* mihi habita); *Davis*, Peru (Mus. V.); *Dinelli*, alt. 1800 meters, Distr. Monteros, Prov. Tucumán, Argentina, May, 1906 (Brit.); *S. Echegaray*, Leoncito, Prov. San Juan, Argentina, January, 1876 (Berl.); *Carl Ehrenberg* 437 pro parte, Real del Monte, Hidalgo, Mexico (Berl., 2 sheets); *K. Fiebrig* 3474, on roads, among rocks, Tucumilla near Tarija, Bolivia, January 15, 1904 (Berl.); *Fraser*, Ecuador (Del.); *Funck & Schlim* 1152, alt. 2,850 meters, Sierra Nevada, Prov. Mérida (State of Losandes), Venezuela, September, 1846 (Boiss.; Petrop.); *C. Galander*, Quebrada de los Condoritos, Sierra Achala, Prov. Córdoba, Argentina, March 26, 1881 (Berl.); *idem*, Casa de Piedra near Huestita, Prov. San Luis, Argentina, March 11, 1882 (Berl.); *H. Galeotti* 2021, alt. 1,800–2,100 meters, fields, Cordillera, State of Oaxaca, Mexico, January–April, 1840 (Del., atypica; Par.); *idem* 2067, alt. 2,700 meters, damp woods, eodem loco, September, 1840 (Kew); *idem* 2169, alt. 2,700–3,000 meters, Mt. Orizaba, Mexico, 1840 (Del.; Kew); *August Ghiesbreght*, State of Oaxaca, Mexico, October, 1842 (Del.; Par.); *idem* 85, Chiapas, Mexico (Gray, 2 sheets; Par.; type material of *Bidens attenuata* Sherff); *idem* 533, in the cold region, mountains, Chiapas, etc., Mexico, August–October, 1864–1870 (Boiss.; Brit.; Gray; Mo.; formae); *idem* 534, in pine forests, Chiapas, etc., Mexico, October–November, 1864–1870 (Gray); *R. Hauthal* 223, alt. 3,500–4,000 meters, lower valley at Chuquiaguillo, to east of La Paz, Bolivia, 1905–1906 (Berl.); *idem* 273, alt. 3,600–4,800 meters, La Paz, January, 1906 (Berl.); *idem* 333, alt. about 3,600 meters, eodem loco, 1906 (Berl.); *idem* 381, alt. 3,700 meters, Chuquiaguillo near La Paz, Bolivia, February, 1906 (Berl.); *G. Hieronymus*, vicinity of the Hill of Arjel, Sierra Achala, Prov. Córdoba, Argentina, January 13–15, 1876 (Berl.); *idem*, Hill of the Sala Grande, Sierra Achala, February 13, 1876 (Berl.); *idem*, slopes of the Hill of the Potrerillos, Sierra Achala, February 1, 1877 (Berl.); *idem* 465, at Las Ramadas (caves) near San Miguel, Sierra Achala, March 14, 1876 (Berl.; contra diarrhoeam vel dysentariam incolis accepta); *idem & G. Niederlein* 762, near foot of hill above Vallecito, Sierra Famatina, Prov. La Rioja, Argentina, January 16–20, 1879 (Berl.,

3 sheets); *I. F. Holton* 368, Bogotá, Colombia, November 6, 1852 (Kew); *Humboldt & Bonpland*, alt. 2,880 meters, at base of Mt. Cotopaxi, near Mulalo, Ecuador, May, 1799–1803 (Par.; type of *Bidens humilis* H.B.K.); *iidem*, near Quito, Ecuador, 1799–1803 (Par., 2 sheets; type and cotype of *Bidens Crithmifolia* H.B.K.); *iidem*, Quito, Ecuador (Par., 2 sheets; type material of *Bidens Delphinifolia* H.B.K.); *Alfredo Jahn* 23, alt. 3,000–3,200 meters, State of Trujillo, Venezuela, October 2, 1910 (Berl.; U.S.); *William Jameson*, Ecuador (Mus. V.); *idem* 47, flowering the entire year, environs of Quito, Ecuador (N.Y.); *idem* 55 (type material, Brit.; Del.; Kew); *idem* 61, Andes, Quito (Brit.); *idem* 693, very common, environs of Quito, 1848 (Boiss.; Brit.; Kew; Petrop.; type material of *Bidens consolidaefolia* Turcz.); *C. de Jelski* 653, Callacate, Peru, May, 1879 (Berl.); *I. M. Johnston* 5328, rocky ridge at upper edge of fertile belt, Aguada de Miguel Díaz, Dept. Taltal, Prov. Antofagasta, Chile, December 1–4, 1925 (Gray); *idem* 5442, common locally on cliffs and talus, vicinity of spring, Aguada del Panul, Dept. Taltal, Prov. Antofagasta, December 4, 1925 (Gray); *W. Kalbreyer* 714, alt. 3,150–3,300 meters, Sierra Pelada, Dept. Santander, Colombia, August 30, 1878 (Berl.); *E. P. Killip* 6751, alt. 2,900–3,100 meters, field near Anambiú, "Canaan," Mt. Puracé, Dept. El Cauca, Colombia, June 11–16, 1922 (Gray; Kew; N.Y.; forma foliis var. *molli* adpropinquans); *idem & A. C. Smith* 18212, alt. 3,500–3,700 meters, Páramo de los Puentes, above La Baja, Dept. Santander, Colombia, January 25, 1927 (N.Y.); *Otto Kuntze*, alt. 3,000 meters, Bolivia, April 13–21, 1892 (Berl.); *idem*, alt. 4,200 meters, vicinity of Ovuro and Tapacari, Bolivia, 1892 (N.Y.; sub nom. *Bidente grandiflora* var. *humili*); *F. C. Lehmann* 189, alt. 2,500–3,000 meters, near Calicali and Quito, Ecuador, December 1, 1880 (Boiss.); *idem* 190, alt. 2,800–3,000 meters, Calicali near Quito, eodem tempore (Berl.; Boiss.; Gray; Kew); *idem* 442, alt. up to 3,600 meters, near Quito, November, 1880 (Boiss.; Mus. V.); *Liebmann* 93 (*Hort. Hafn.* 648), alt. 3,000 meters, Mt. Orizaba, Mexico (Gray); *J. J. Linden* 491, alt. 450–2,910 meters, foot of Mt. Orizaba, Vera Cruz, Mexico, August, 1838 (Del., 2 sheets; Kew); *idem* 737, alt. 3,300 meters, Páramo de las Cruces, Prov. Pamplona, Colombia, November, 1842 (Brit.; Del.; Mus. V.); *P. G. Lorentz* 686, Ascochinga, Argentina (Berl.); *idem & G. Hieronymus* 147, Los Potreros, Argentina, March 24, 1873 (Berl.); *J. F. Macbride* 3182 and 3183, alt. about 2,100 meters, steep, stony slopes, Ambo, Peru, April 5, 1923 (Field); *idem* 3263, sunny, stony, grassy hillsides, Mito, Peru, April 8–18, 1923 (Field); *idem* 3345 and 3347,

alt. 2,700 meters, grassy hillsides, eodem loco et tempore (Field); *idem* 3467, 3469, 3470, and 3471, grassy slopes, alt. about 2,550 meters, Cani, northeast of Mito, Peru, April 16–26, 1923 (Field); *idem* 3501 and 3502, alt. about 2,100 meters, loose-stony slopes, Huánuco, Peru, April 26, 1923 (Field); *idem* 4363, alt. about 3,900 meters, sprawling on mossy, rocky, open uplands, Tambo de Vaca, Peru, June 10–24, 1923 (Field); *G. Mandon* 45 (pro parte), alt. 3,200 meters, between Mt. Pocara and Habaya, Prov. Larecaja, Bolivia, February, 1859 (Boiss.; Brit.; Del.; Kew; Par.; Mus. V., 2 sheets); *idem* 46 pro parte, alt. 2,800 meters, slopes of hills, uncultivated places, etc., Sorata, Bolivia, March, 1859 (Berl.; Brit.; Del.; Gray; Mus. V., 2 sheets; Petrop., 3 sheets; cum var. *molli*, etc., lecta); *idem* 50 pro parte, alt. 3,900 meters, near Ancouma, Bolivia, April, 1860 (ex herb. Schz. Bip. in Par., type of *Bidens pectinata* Schz. Bip., nom. subnudum: cotypes, Gray; N.Y.; Par.); *idem* 51, alt. 4,000 meters, in rocky places, Mt. Avichaca, near Achacache, Bolivia, January, 1859 (Boiss.; Brit.; Del.); *idem* (similiter) 51, alt. 3,300 meters, on slopes of hills, near Choquecoa, Bolivia, February 5, 1859 (Boiss.; Del.; Gray; Kew; Mus. V.); *idem* 52 pro parte, alt. 2,650–3,300 meters, along road to Lacatia, Bolivia, February–March, 1860 (Gray; N.Y.; cum var. *molli* lecta); *idem* (similiter) 52, alt. 2,800 meters, slopes of hills, Sorata, Bolivia, May, 1860 (Berl.; Brit.; Del., 2 sheets; Gray; Mus. V.; N.Y.; type material of *Bidens humilis* var. *major* Schz. Bip., nom. subnudum); *W. R. Maxon* 5359, alt. 3,025–3,374 meters, rocky, open slope, upper belt and summit of Chiriquí Volcano, Panama, March 12, 1911 (U.S.); *John Miers* 886, Achiras, Argentina (Kew); *Moritz* 1401, Colombia, October–November (Berl.; Boiss.; Kew; nomen incolarum, flor amarilla); *Fred. Müller* 218, Mt. Orizaba, Mexico, August, 1853 (Mus. V.; N.Y.; Petrop.); *E. W. Nelson* 1796, alt. 2,010–3,000 meters, near Reyes, Oaxaca, Mexico, Oct. 20, 1894 (U.S.); *W. H. Osgood & M. P. Anderson* 88, Celendín, Peru, May 2, 1912 (Field); *Edward Palmer* 158 p.p. and 158*bis*, Alvarez, San Luis Potosí, Mexico, September 28–October 3, 1902 (Calif.; Field); *idem* 1117, San Luis Potosí to Tampico, Mexico, December, 1878–February, 1879 (Field; Phila., 2 sheets; U.S.); ex *herb. Pavonii* e seminibus peruvianis et sine multo dubio culta (Boiss., sub nom. *Bidente magniflora*); *R. Pearce*, alt. 3,600 meters, Andes, Ecuador (Kew); *F. W. Pennell* 2142, alt. 2,600–2,700 meters, field on plain, southwest of Las Cruces, Bogotá, Colombia, September 24–25, 1917 (Mo.; N.Y.); *idem* 2405, alt. 2,800–2,900 meters, bank, edge of woods above El Peñón, southwest of Sibate, Dept.

BIDENS UGANDENSIS (S. L. Moore) Sherff

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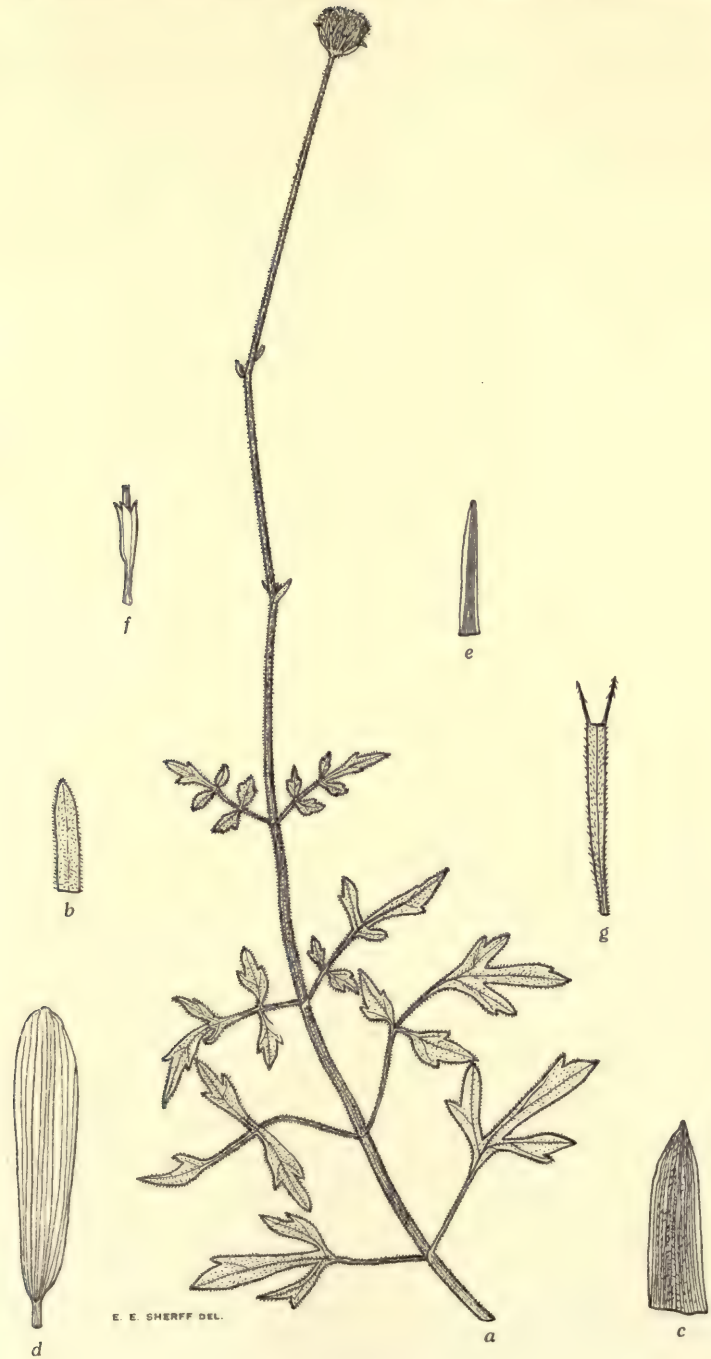
Cundinamarca, Colombia, October 13, 1917 (N.Y.); *idem* 13361 and 13361*a*, alt. 3,000–4,000 meters, rocky, clay slope over limestone, Chuquibambilla, Dept. Puno, Peru, April 19–21, 1925 (Berl.; Field); *idem* 13881, alt. 3,800–3,900 meters, open, grassy páramo, Paso de Tres Cruces, Cerro de Cusilluyoc, Dept. Cuzco, Peru, May 3, 1925 (Field); *K. Pflanz* 107, alt. 4,000 meters, Palca, Dept. La Paz, Bolivia, April, 1909 (Berl.); *idem* 204, alt. 4,300 meters, eodem loco, February, 1908 (Berl.); *idem* 403, alt. 3,650 meters, eodem loco, March 6, 1910 (Berl.); *H. Pittier* 1337, alt. 2,500–3,000 meters, characteristic of upper forest zone and of lower páramo, Las Escaleretas, Moras Valley, Rio Páez Basin, Tierra Adentro, Dept. Cauca, Colombia, February, 1906 (Field; U.S.); *idem* 3087, alt. 3,000–3,374 meters, dry, sunny places, upper belt, northern slope of Chiriquí Volcano, Panama, March 10–13, 1911 (Gray; U.S.); *Eduard Poeppig* 1376, open, herb-grown, mountainous places at Casapí, Peru, September, 1829 (Mus. V.); *idem* 1378, open, warm, mountainous places, Casapí, eodem tempore (Mus. V.: Oxf.; type material of *Bidens Artemisiaefolia* Poepp. & Endl.); *idem* (similiter) 1378, Cochero, Peru, 1829 (Mus. V.); *P. Preuss* 1417, alt. 2,000 meters, between Perote, Vera Cruz, and Teziutlán, Puebla, Mexico, May 13, 1900 (Berl.); *G. H. Pring* 97, Sabana de Bogotá, Colombia, May, 1923 (Mo.); *C. G. Pringle* 4915, alt. 3,090 meters, Sierra de San Felipe, Oaxaca, Mexico, September 26, 1894 (Berl.; Boiss.; Brit.; Calif.; Carn.; Del.; Gray; Kew; Mo.; Mun.; Mus. V.; Par.; Phila.; U.V.); *idem* 7924, alt. 3,000 meters, Sierra de Pachuca, Hidalgo, Mexico, October 6, 1899 (Berl.; Mo.); *C. A. Purpus* 1548 pro parte, rocky soil above timber line, Mt. Ixtaccihuatl, Mexico, October, 1905 (Mo.; cum var. *molli* lecta); *idem* 2637, moist, shaded soil, Alta Luz, Puebla, Mexico, August, 1907 (Berl.; Calif.); *idem* 4135, alt. 2,100–2,400 meters, oak forests, Coxcatlán, Puebla, September, 1909 (Calif.); *idem* 5089 pro parte, El Chico, Hidalgo, Mexico, September, 1905 (Calif.; cum specie ipsa lecta); *idem* 5620, Esperanza, Puebla, Mexico, September, 1911 (Calif.); *Rivet* 134, 147, and 156, Riobamba, Ecuador, August, 1901 (Par.); *idem* 209, Quito, Ecuador, October, 1902 (Par.); *idem* 373, Bella Vista, Ecuador, February, 1903 (Par.); *idem* 654, Ecuador, August, 1904 (Par.); *idem* 756, Niarihuinia, Ecuador, December, 1904 (Par.); *J. N. Rose & R. Hay* 6039 pro parte, Mt. Popocatapetl, Mexico, August 7–8, 1901 (U.S.; cum specie ipsa lecta); *J. N. Rose & J. H. Painter* 7949 pro parte, Nevada de Toluca, State of Mexico, October 15, 1903 (U.S., cum var. *molli* lectum); *H. Ross* 501, alt. about 1,200 meters, on arid

hills, Zapotlán, Jalisco, Mexico, August, 1906 (Mun.); *H. H. Rusby* 1685, alt. 3,000 meters, near La Paz, Bolivia, October, 1885 (Kew); *idem* 2129, eodem loco, April, 1885 (N.Y.); *Sallé*, Villa Alta, Oaxaca, Mexico (Brit.; Kew; forma quam olim pro *Bidente attenuata* habui); *Osbert Salvin*, alt. 3,000–3,450 meters, Volcán de Fuego, Guatemala, November 17, 1873 (Kew); *Scherzer*, alt. 3,000–3,810 meters, fir region near crater, Volcán de Santa María, Guatemala, August, 1854 (Mus. V.); *Schiede*, near Angangueo, Michoacán, Mexico, October (Berl.); *idem* 342, summit of mountain, Mexico, August, 1830 (Berl., 2 sheets); *L. Schlim* 4066, alt. 2,700 meters, Prov. Pamplona (North Santander), Colombia, January, 1846–1852 (Boiss.; Del., 2 sheets); *Berthold Seemann* 669, Loja, Ecuador, August, 1847 (Kew); *Eduard Seler* 123, La Paz, Bolivia, June 23, 1910 (Berl.); *idem & Caecilie Seler* 2376, alt. 3,000 meters, Totonicapám, Dept. Quezaltenango, Guatemala, September 25, 1896 (Berl.; N.Y.); *iidem* 3021, alt. 3,000 meters, ridge of the Cordillera between Todos los Santos and Chiantla, Dept. Huehuetenango, Guatemala, September 11, 1896 (Berl.); *W. C. Shannon* 3691, alt. 3,720 meters, summit of Volcán de Acatenango, Dept. Zacatepéquez, Guatemala, August, 1892 (Field); *C. L. Smith* 300, alt. 3,000 meters, Sierra de San Felipe, Oaxaca, Mexico, September, 1894 (Mo.; N.Y.); (*H. H. Smith* 1980, formerly referred here, is seen to be var. *nematoidea;*) *A. Sodiro* 2313, Ecuador (Berl.); *idem* 4311, in sandy places, Andes (Berl.); *idem* 4312, sandy places among Andes, Pomasqui, etc., Ecuador (Berl.); *R. Spruce* 5048, Tunguragua, Ecuador, 1857–1859 (Boiss.; Brit.; Del.; Kew, 2 sheets; Mus. V., 2 sheets); *idem* 5049, Andes, Ecuador, 1857–1859 (Boiss.; Brit.; Del.; Kew, 2 sheets; Petrop.; U.V.); *idem* 5894, common in fields, along walls, etc., through the Cordillera of Quito, Ecuador, December, 1858 (Boiss.; Brit.; Del.; Gray; Kew; Par.; Petrop.); *R. J. Stordy*, hills above Abancai, Peru (Kew, 2 sheets); *idem*, alt. 3,280 meters, Valley of Anta, Cuzco, Peru (Kew); *A. Stübel* 12, alt. 3,600 meters, Páramo del Cerro Ungui, Ecuador, March, 1870 (Berl., 2 sheets); *idem* 43*b* p.p., Tambo, Peru, April–June, 1875 (Berl.); *idem* 53*b*, Cerro Colacachi, Cuicacha, Prov. Imbabura, Ecuador, November–December, 1870 (Berl.); *idem* 67*b*, alt. 4,000 meters, Cerro Imbabura, Ecuador, March, 1870 (Berl.); *idem* 102*c*, road to La Peña, Bogotá, Colombia, April–May, 1868 (Berl.); *idem* 143 pro parte, alt. 2,100–2,300 meters, dry soil, Loma de Canaballa and environs, Prov. Imbabura, Ecuador, January–February, 1871 (Berl.; nom. vulg., ñacha); *idem* 254, sandy soil, Riobamba and environs, Ecuador, 1872 (Berl., 2 sheets); *idem* 298*a*,



BIDENS CINEREA Sherff

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Pucará de Chisaló, Ecuador, January–March, 1874 (Berl.); *idem* 338*a*, alt. 3,800 meters, Páramo de Sotará, Colombia, June, 1869 (Berl.); *Thomson*, Nilgiri Hills, India, December, 1871 (Kew); *C. H. T. Townsend A*213 and *A*214, alt. 2,400–2,850 meters, opposite Huancabamba, Western Cordillera, Peru, Sept. 26, 1911 (Field); *idem* 1519, Oroya, Peru, May 7, 1914 (U.S.); *J. J. Triana* 1369 p.p., alt. 2,600 meters, Soacha, Prov. Bogotá, Colombia, 1851–1857 (Par., 2 sheets); *idem* 1374 pro parte, alt. 2,700 meters, Suasco, Prov. Bogotá, Colombia (Brit.; Kew; Par.; cum var. *hirtella* lecta); *idem* 1375 pro parte, Bogotá, Colombia (Brit.; cum specie ipsa lecta); *Uhde* 622, Mexico (Berl.); *U. S. S. Pacif. Expl. Exped.* under *Capt. Wilkes*, Andes, Peru, 1838–1842 (Gray); *Warburg* 419, Nilgiri Hills, India (Berl.); *Warszewicz* 38, Chimborazo Cordillera, Ecuador (Berl.); *G. Watt* 2160, alt. up to 900 meters, Metapollium, Nilgiri Hills, India, June, 1876 (Kew); (*Weberbauer* 435, formerly placed here, is better considered as f. *octoradiata;*); *idem* 5613, alt. 2,400–2,500 meters, Dept. Ayacucho, Prov. Huanta, Peru, June 1, 1910 (Berl.); *idem* 7617, Mantaro Valley, near La Mejorada, Dept. Huancavelica, Prov. Tayacaja, Peru, March 21, 1926 (Field); *Edward Whymper*, alt. 4,650–4,950 meters, south side of Mt. Chimborazo, Ecuador, January 4, 1880 (Brit.); *idem*, alt. 3,900–4,200 meters, north and northeast sides, eodem loco, January 7, 1880 (Brit.); *Von Winkler* 214, Quito, Ecuador (Petrop.).

As stated in an earlier paper (Bot. Gaz. 61: 500. 1916), the two type specimens from which Kunth described *B. Crithmifolia* and *B. Delphinifolia* are still extant in good condition (Par.). Both are from Ecuador[1] and differ only in the slightly diverse foliage. The immature type of *B. Crithmifolia* is matched exactly by *J. J. Triana* 1374 pro parte (Par.), a specimen collected near Bogotá, Colombia, which is superior in showing not only flowering heads but also numerous achenes. These achenes are mainly 2-aristate, but some are 3-aristate and so agree perfectly with achenes of *B. Delphinifolia*.[2] Fortunately, I have found another specimen by Triana of the same number in the British Museum of Natural History, and this shows the slightly different foliage of *B. Delphinifolia*, for which it might well be taken to represent a supplementary type.

[1] Kunth (loc. cit.) expressed uncertainty as to the locality whence *B. Delphinifolia* had come, but Bonpland's duplicate specimen (Par.) has the original label marked "XI Quito."

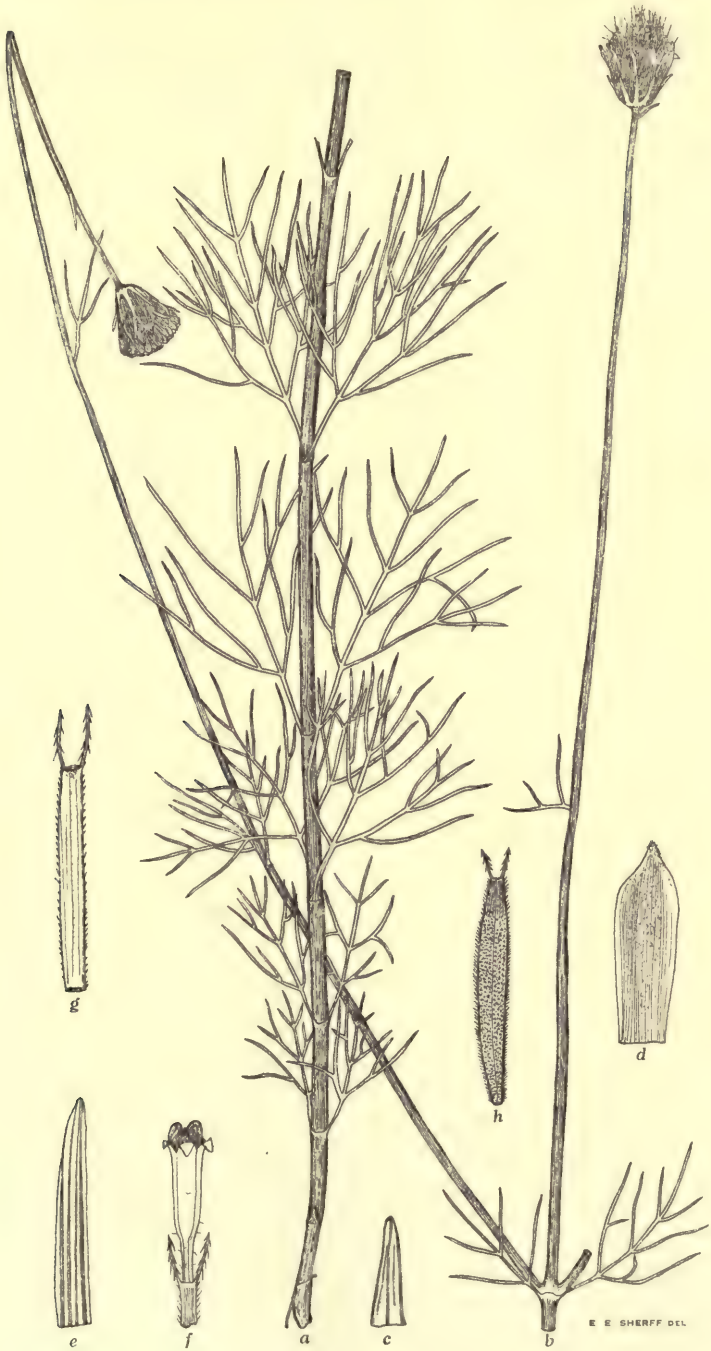
[2] It is interesting to note that the mature head on the type of *B. Delphinifolia* has at least one achene that is 2-aristate, showing no indication of a third awn's ever having been present (cf. H.B.K. loc. cit., "triaristata").

There is great variation in foliage. *Triana* 1375 (Brit.) shows one plant with leaves tripartite, the leaflets being incisely dentate, and another plant with the simple, ovate-lanceolate leaves of *B. triplinervia* proper. In fact, the sheet of *Triana* 1374 in Paris bears another specimen (besides that cited above) which has similarly simple, ovate-lanceolate leaves; and still another specimen of *Triana* 1374 at Paris has the slender, undivided leaves of var. *hirtella*. Evidently Triana did not differentiate in the field between the two types of simple leaves or between these and the finely divided ones.

In 1914, on comparing the simple-leaved spontaneous state (*Triana* 1374 pro parte and 1375 pro parte, also *Goudot*, ditches, Fontibón, February 20, 1844) with the mature *B. affinis* and immature *B. triplinervia* material, I was impressed with their similarity. I searched, but in vain, for any authentic material of *B. affinis* manifesting the divided leaves so much more common than undivided ones on *B. Crithmifolia*. Later, I was permitted, through the kindness of Dr. Alex. Zahlbruckner to study the large set of *Bidens* specimens in the Natural History Museum of Vienna and found three more sheets of the original *B. affinis* material. These display numerous gradations from the typical undivided, lanceolate leaves of *B. affinis* to the bipinnate leaves characteristic of *B. Crithmifolia*. The plants are a little larger, but this doubtless was due to cultivation. The floral and achenial characters are identical. The plants with decompound foliage (*B. Crithmifolia*, *B. Delphinifolia*, etc.) are, therefore (cf. Bot. Gaz. 76: 156. 1923), not more than varietally distinct from *B. affinis* Kl. & O. and, hence, from its equivalent, *B. triplinervia* H.B.K.

Because of the great rarity of the form with undivided, ovate-lanceolate leaves (*B. triplinervia* proper) and the evolutionary detachment from this simple-leaved form that the various forms with divided leaves manifest to-day, it seems wisest to associate without distinction all the cut-leaved forms, except vars. *mollis* and *nematoidea*, under the earliest varietal name, var. *macrantha*. Accordingly, this has been done in the present treatment.

B. humilis H.B.K., the type of which also came from Ecuador, is not varietally distinct from *B. Crithmifolia* and therefore reduces, likewise, to var. *macrantha* (cf. Weddell, Chlor. And. 1: 69. 1855: "Le *B. crithmifolia* H.B.K. et le *B. delphinifolia* H.B.K. sont très voisins de cette espèce *B. humilis*, dont ils ne sont même peut-être que des formes à feuilles moins divisées, et à lanières plus allongées";



BIDENS CROCEA Welw. *ex* O. Hoffm. (figs. *a–g*); var. VERRUCIFERA S. L. Moore (fig. *h*)

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also Jameson, Syn. Pl. Aequator. 2: 117. 1865: "a *B. crithmifolia* et *B. delphinifolia* vix distincta videtur."). *B. consolidaefolia*, described by Turczaninow from *Jameson* 693, collected at Quito, is a form with finely divided, very pubescent leaves (cf. Turcz. Ann. Bot. Syst. 5: 225. 1858: "Accedit ad definitionem *B. humilis* H.B.K. sed ligulae duplo majores, achaenia minime scabra et forte laciniae folior. angustiores.").

B. decomposita var. *hirsutior* was described by Clarke (cf. Bot. Gaz. 61: 500. 1916) from a single specimen collected by him at an altitude of over 2,200 meters, in the Nilgiri Mountains of British East India. Later he informed J. D. Hooker (cf. Fl. Brit. Ind. 3: 310. 1881) that he supposed it to be some cultivated plant. Hooker admits having seen no specimen of it, but it happens that Clarke's original specimen ("11207... 23 March 1870... coll. *C. B. Clarke.*") was sent to Kew Herbarium in 1877 and is still there in good condition. The plant is very different from *Bidens decomposita* Wall., but its villous, finely divided leaves match fairly well *Jameson* 693, the type collection of *B. consolidaefolia* Turcz. It matches also a number of other South American specimens of *B. triplinervia* var. *macrantha*. In the same region of India Dr. Watt collected material (*Watt* 2160) that agrees with Clarke's specimen except that it is minutely pubescent as to leaves and glabrous as to stems. Still more specimens from this region occur (e.g., *Thomson*, Eclipse Exped., Nilgiri Hills, December, 1871, determined on sheet as "*Bidens humilis* H.B.K.," in Kew; and *R. H. Beddome* 4511, "introd.? a common weed," Nilgiri Hills, in Brit.), some of them glabrous and some pubescent but all indistinguishable from *B. triplinervia* var. *macrantha*. A study of these specimens, all collected in the same region at about the same time, and by two of the collectors suspected of being introduced, shows beyond doubt that they were merely forms of *B. triplinervia* var. *macrantha* carried, perhaps in ballast, from South America to the southwest shores of British East India.[1]

At times, dwarfed, immature forms of *B. andicola* H.B.K. deceptively resemble the var. *macrantha* and thus frequently have been confused with it in herbaria. *B. serrulata* (Poir.) Desf. (*B. grandiflora* Balb.) appears really distinct from var. *macrantha*, despite the implication of Dr. Otto Kuntze's name *B. grandiflora* var. *humilis* (cf. O. E. Schulz in Urban, Symb. Antill. 7: 139. 1911: "Sine dubio pleraque specimina ab O. Kuntze l.c. commemorata ad species

[1] Cf. Fyson (Fl. Nilgiri and Pulney Hill-tops above 6500 feet 1: 237. 1915), who, though omitting historical details, lists *B. humilis* from South America as an introduction into the Nilgiri Hill region.

propinquas pertinent," a criticism justified also by Kuntze's incorrect association of Clarke's var. *hirsutior* with *B. pilosa* L. Kuntze's combination derived, perhaps, from the fact that in certain localities of Mexico (e.g., Mt. Orizaba and Sierra de Pachuca) a few plants of var. *macrantha* (i.e., of *B. humilis* H.B.K.) are found with a more robust growth habit, suggesting somewhat that of *B. serrulata* (Poir.) Desf. (i.e., of *B. grandiflora* Balb.).

The several original specimens of *B. Artemisiaefolia* Poepp. & Endl. still extant (Mus. V.; Berl.) are the form of var. *macrantha* with tomentose pubescence and 2–3-pinnatifid leaves. They match rather closely the original material of *B. decomposita* var. *hirsutior* and *B. consolidaefolia*. They were collected by Poeppig, No. 1378, in "Peruvia subandina. In montibus apertis calidis ad Cassapi. Septbr. 1829."

Bidens triplinervia var. γ. **macrantha** f. 1. **octoradiata** Sherff, Bot. Gaz. 92: 203. 1931.

E var. *macrantha* capitulis regulariter 8-radiatis differt.

Type specimen: Collected by *K. Pflanz*, No. 406 pro parte, at altitude of 3,550 meters, on schist slope, Chullo, Palca, La Paz, Bolivia, March 13, 1910 (Berl.).

Distribution: Argentina to Guatemala.

Specimens examined: *R. Hauthal* 273, alt. 3,600–4,800 meters, La Paz, Bolivia, January, 1906 (Berl.); *F. L. Herrera* 1828, alt. 3,500 meters, Hacienda Churu, Valle del Paucartambo, Peru, February, 1928 (Berl.); *Pflanz* 406 p.p. (type, Berl.); *A. Mathews* 571, Peru, April (Gray); *Eduard Seler*, Sierra Chica, Prov. Córdoba, Argentina, April 1, 1910 (Gray); *idem & Caecilie Seler* 3021, alt. 3,000 meters, Cordillera between Todos los Santos and Chiantla, Guatemala, September 11, 1896 (Berl.); *A. Stübel* 43*b* p.p., Peru, April–June, 1875 (Berl.); *A. Weberbauer* 435, alt. 3,700 meters, Peru, February 24–25, 1902 (Berl.).

Bidens triplinervia var. δ. **mollis** (Poepp. & Endl.) Sherff, Bot. Gaz. 80: 384, *pl. 22, figs. a–i.* 1925. Pl. CXXVIII, figs. *a–i.*

Bidens mollis Poepp. & Endl. Nov. Gen. et Sp. 3: 49. 1845.

Folia tripartita, saepius molliter pubescenti-villosa, saepe subcanescentia, foliolis serratis, lateralibus plerumque ovatis, abrupte in basim sessilem contractis, terminali majore, oblongo-ovato vel rhomboideo-ovato.

BIDENS FLABELLATA O. Hoffm.

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Type specimen: Collected by *Eduard Poeppig*, No. 1377, in open, warm places, calcareous mountains at Casapí (sub-Andean region), Peru, September, 1829 (Mus. V.).

Distribution: From Bolivia and Peru northward along the Andes into Colombia; common in Guatemala; northwestward through the eastern part of Mexico as far as the State of San Luis Potosí and southwestern Chihuahua.

Specimens examined: *Anon.* (communic. H. Broughton-Leigh), alt. 4,500 meters, Mt. Popocatapetl, Mexico (Kew); *Barnes, Chamberlain, & Land* 5 pro parte, along railroad below Las Vegas, Vera Cruz, Mexico, September 8, 1906 (Field; cum var. *macrantha* lecta); *Gust. Bernoulli* 155, dry place, Calvario, Guatemala, November, 1865 (Berl.; Del.; Kew); *I. W. Clokey* 1854, bank of stream, Real del Monte, Hidalgo, Mexico, October 1, 1910 (Mo.); *Thomas Coulter* 392, Mexico (Gray, 2 sheets; Kew; N.Y., forma plus minusve glabrata); *C. Ehrenberg* 437 pro parte, Mineral del Monte, Hidalgo, Mexico, September–November (Berl.); *idem* 439, Regla, Hidalgo (Berl.); *Rosalio Gómez* 1073, alt. 1,950 meters, Santiago, Dept. Zacatepéquez, Guatemala, 1891 (Gray; Kew); *Heyde & Lux* 4503, alt. 1,650 meters, Embaulada, Dept. Zacatepéquez, Guatemala, December, 1889 (Field; Gray; Kew); *E. W. D. & Mary M. Holway* 575, Sorata, Bolivia, April 26, 1920 (Gray); *Humboldt & Bonpland* 3322, in forests (Berl.); *W. A. Kellerman* 4396, Volcán de Agua, Dept. Zacatepéquez, Guatemala, February 18, 1905 (U.S.); *F. C. Lehmann* 357, alt. 2,000 meters, edges of woods and open forest places, Tunguragua River, Ecuador, October 31, 1879 (Boiss.; Gray; Kew); *idem* 433, alt. 2,000 meters, arid valley of Baños on Tunguragua River, Ecuador, December 13, 1880 (Berl.; Boiss.; Gray); *idem* 1608, abundant at 2,000 meters, damp places, San Marcos, Guatemala, June 17, 1884 (Berl.; Boiss.; Gray; Kew; forma 6 dm. alta, foliolis 3–5 cm. longis); *idem* 2835, alt. 2,600–3,000 meters, above País Camba on the Sotorá, Cauca, Colombia, May 6, 1883 (Berl.; Boiss.; Gray); *idem* 3511, alt. 2,650 meters, Cauca, Colombia, February 1, 1884 (Brit.); *idem* 5977, alt. 2,500–2,800 meters, Alto de Pesares, above Popayán, Colombia (Kew; N.Y.); *Liebmann* 645, alt. 3,000 meters, Orizaba, Mexico (U.S.); *G. Mandon* 43, alt. 2,650–3,200 meters, everywhere in dry places, rocky places, uncultivated places, etc., Sorata, Bolivia, February–May, 1859 (Boiss.; Brit.; Del.; Gray; Mus. V.; N.Y.); *idem* (similiter) 43, alt. 2,600–2,700 meters, hilly slopes, etc., Espada Munaypata, San Pedro, Bolivia, March, 1859 (Del., 2 sheets); *idem* 46 pro parte, alt. 2,800 meters,

slopes of hills, uncultivated places, etc., Sorata, Bolivia, March, 1859 (Boiss.; cum var. *macrantha* lecta); *A. Mathews*, Prov. Chachapoyas, Peru, communic. 1846 (Del., 2 sheets; Kew; forma multis vel omnibus achaeniis exaristatis); *Edward Palmer* 158 p.p., Alvarez, San Luis Potosí, Mexico, September 28–October 3, 1902 (Calif.; Carn.; Field); *idem* 358, southwestern Chihuahua, Mexico, August–November, 1885 (U.S.); *idem* 2062, Sierra Madre, Coahuila, Mexico, February–October, 1880 (Gray; Kew; forma); *Poeppig* 1377 (type, Mus. V.); *C. A. Purpus* 1547, alt. 2,700–3,000 meters, open woods, Mt. Ixtaccihuatl, Mexico, November, 1905 (U.S.); *idem* 1548 pro parte, rocky soil above timber line, eodem loco, October, 1905 (Calif.; Field; Mo.; cum var. *macrantha* lecta); *J. N. Rose & J. H. Painter* 6666, between Pachuca and Real del Monte, Hidalgo, Mexico, August 31, 1903 (U.S.); *iidem* 7949 pro parte, Nevada de Toluca, State of Mexico, October 15, 1903 (U.S.; cum var. *macrantha* lecta); *iidem & J. S. Rose* 9184, between Somoriel and Las Lajas, Hidalgo, Mexico, August 5, 1905 (Gray; U.S.; forma var. *macranthae* adpropinquans); *Osbert Salvin*, alt. 1,800 meters, Volcán de Fuego, Guatemala, October 20, 1873–1874 (Kew); *idem & Godman* 74, Calderás, Guatemala, 1861 (Kew); *R. Spruce* 5047, foot of Mt. Tunguragua, Ecuador, 1857–1859 (Boiss.; Brit.; Cop.; Del., 2 sheets; Kew, 2 sheets; Mus. V.; Par.; Petrop.); *Thomson*, Nilgiri Hills, India, December, 1871 (Kew; forma valde glabra); *H. Von Tuerckheim* 1179, alt. 1,500 meters, Santa Rosa, Dept. Baja Verapaz, Guatemala, April, 1887 (Gray; Kew).

The type of *Bidens mollis* Poepp. & Endl., *Poeppig* 1377, was found growing with the type material of *B. Artemisiaefolia* (referred above to *B. triplinervia* var. *macrantha*). Its achenes were immature and the leaves tripartite. In pubescence, floral characters, and general habit it was similar to the *B. Artemisiaefolia* specimens. The peculiar outline of the leaf divisions, however, would seem at first to suggest *B. andicola* more strongly. *Spruce* 5047 matches the *B. mollis* type very closely. *Spruce* 5049 (Brit.) and 5894 (Gray) match *Spruce* 5047 minutely except that they show the leaves finely divided, as in *B. Artemisiaefolia*. These and other similar considerations show beyond all doubt that *B. mollis* belongs to *B. triplinervia*, is merely a foliage form, and, as such, should be accorded no higher than varietal rank.

Bidens triplinervia var. ϵ. **nematoidea** Sherff,
Bot. Gaz. 88: 287. 1929.

A specie foliis numerosissimis et pinnatis vel bipinnatis, segmentis capillaribus plerumque tantum circ. 0.3–0.6 mm. latis differt.

BIDENS BAUMII (O. Hoffm.) Sherff

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Type specimen: Collected by *H. L. Viereck*, No. 5, Cerro Quemado, Santa Marta, Colombia, December 17, 1922 (U.S.).

Distribution: Known only from Province of Santa Marta, Colombia.

Specimens examined: *H. H. Smith* 1980, rare on open lands, alt. 1,950–2,250 meters, San Lorenzo Ridge, January 26, 1899 (N.Y.); *H. L. Viereck* 5 (type, U.S.).

In 1913 the Smith plant from Santa Marta was noted as a singular foliage form and photographs (my photograph No. 341) were distributed to several herbaria. Recently I have been sent the Viereck plant, collected in the same locality and revealing similar characters. On both specimens the segments of the very numerous and pinnately or more often bipinnately parted leaves are strikingly thread-like. Otherwise the plants are like those of the very common var. *macrantha* (Wedd.) Sherff.[1]

EXPLANATION OF PLATE CXXVI

Bidens triplinervia, figs. *j*, *k*: *j*, small portion of plant, ×0.57; *k*, lower surface of portion of leaf in *j*, ×3.39; from *J. Triana* 1375 pro parte, in Hb. Brit.

Bidens triplinervia var. *macrantha*, figs. *a–i*, *l–v*: *a*, *p*, flowering and fruiting branches (the strongly pubescent foliage of *p* left glabrous in the sketch), ×0.57; *b*, exterior involucral bract, ×4.52 (*q*, exterior involucral bract, ×2.83); *c*, interior involucral bract, ×4.52 (*r*, interior involucral bract, ×2.83); *d*, ray corolla, ×4.52 (*s*, ray floret, ×2.83); *e*, palea, ×4.52 (*t*, palea, ×2.83); *f*, disc floret, ×4.52 (*u*, disc floret, ×2.83); *g*, achene, ×3.39 (*v*, achene, ×2.83); *h*, *i*, *l–o*, various leaves, ×0.57; *a–f*, from Bonpland's private cotype of *Bidens Delphinifolia* H.B.K., in Hb. Par.; *g*, from *Triana* 1374, in Hb. Brit.; *h*, *i*, from *Humboldt* and *Bonpland*, Quito, Ecuador (type of *Bidens Crithmifolia* H.B.K.), in Hb. Par.; *l–n*, from *Triana* 1375 pro parte, in Hb. Brit.; *o*, from *Dr. Thomson*, Nilgiri, British East India, December, 1871, in Hb. Kew; *p–v*, from *C. B. Clarke* 11207 (type of *Bidens decomposita* var. *hirsutior* C. B. Clarke), in Hb. Kew.

EXPLANATION OF PLATE CXXVII

Bidens triplinervia var. *hirtella*: *a*, flowering branch, ×0.68; *b*, exterior involucral bract, ×8.12; *c*, interior involucral bract, ×8.12; *d*, ray corolla, ×2.71; *e*, palea, ×8.12; *f*, disc floret, ×8.12; all from type.

[1] The capitula are 5-rayed; the mature achaenia (6–8 mm. long) are exaristate (as sometimes happens in the var. *macrantha* too) and are somewhat surpassed by the paleae. Smith reported the plants as growing erect and up to 18 inches high.

EXPLANATION OF PLATE CXXVIII

Bidens triplinervia var. *macrantha*, figs. *j–p*: *j*, cauline leaf (seen from beneath, leaflets mostly flattened out but petiole left convolute, its ciliation thus not showing), ×1.35; *k*, exterior involucral bract, ×4.05; *l*, interior involucral bract, ×4.05; *m*, ray corolla, ×2.03; *n*, palea, ×4.05; *o*, disc floret, ×4.05; *p*, achene, ×4.05; all from *Ghiesbreght* 85 pro parte, Chiapas, Mexico (type of *Bidens attenuata* Sherff).

Bidens triplinervia var. *mollis*, figs. *a–i*: *a*, *b*, branches with leaves and flowers, ×0.68; *c*, portion of leaf, enlarged to show pubescence, ×2.7; *d*, exterior involucral bract, ×4.05; *e*, interior involucral bract, ×4.05; *f*, ray corolla, ×2.03; *g*, palea, ×4.05; *h*, disc floret, ×4.05; *i*, achene, ×4.05; *a*, *b*, from *Spruce* 5047, in Hb. Mus. V.; *c–h*, from type; *i*, from *Spruce* 5047, in Hb. Kew.

151. **Bidens acrifolia** Sherff, Bot. Gaz. 94: 591. 1933.

Herba forsitan perennis, plus minusve glabrata, caulibus vel ramis gracilibus. Folia petiolata petiolis usque ad circ. 1 cm. longis, petiolo adjecto principalia saltem 3–4 cm. longa, bipinnatisecta segmentis linearibus firmulis terminaliter subsensim ad apicem acerrimum angustatis, 1–3 mm. latis; summa simplicia lineariaque vel unipinnata. Capitula solitaria tenuiter pedunculata pedunculis ± 5 cm. longis ramum terminantibus, radiata, pansa ad anthesin ± 2.5 cm. lata et ± 8 mm. alta. Involucri plus minusve hispiduli bracteae exteriores circ. 12, lineares, acutae, 5–7 mm. longae, quam interiores ovato-oblongae paulo longiores. Flores ligulati ± 6, flavi, ligula elliptico-oblongi, circ. 1–1.4 cm. longi. Achaenia matura deficientia. Ovaria minima, plana, biaristata aristis tenuibus calvisque.

Type: Collected by *M. P. Dehesa*, No. 1532, at altitude of 1,600 meters, Mala Noche, Concordia, State of Sinaloa, Mexico, September (Kew).

Distribution: Known only from type locality in State of Sinaloa, Mexico.

Specimens examined: *Dehesa* 1532 (type, Kew; nom. vulg., palmita; unico ramo viso).

The general habit, so far as can be inferred from the single branch examined, is somewhat similar to that of *Bidens Geraniifolia* and *B. triplinervia* var. *macrantha*. The foliar segments are especially acute, however, and the unbarbed achenial aristae should render distinction easy.

BIDENS MOOREI Sherff (figs. *a–g*); var. VERRUCOSA Sherff (figs. *h*, *i*)

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152. **Bidens insolita** Sherff, Bot. Gaz. 97: 607. 1936.

Verisimiliter perennis suberectaque; caulibus gracilibus, angulatis, glabratis, non nisi ad summam ramosis, ± 4 dm. altis. Folia petiolata petiolis planis convexo-concavisve sparsim setoso-ciliatis sub 2 cm. longis, petiolo adjecto usque ad 1 dm. longa, bipinnatisecta; foliolis plerumque 5, saepe (segmentis linearibus apicaliter acerrimis membranaceis glaberrimis antrorsum spectantibus) subflabelliformibus. Capitula (4–8) subcorymbose disposita pedicellis tenuibus usque ad 8 cm. longis, radiata, pansa ad anthesin circ. 3–3.5 cm. lata et 8–10 mm. alta. Involucri bracteae exteriores plerumque 8, lineares, extus glabratae, marginibus albido-ciliatae, apice induratae et saepe acres, 4–5 mm. longae, quam interiores ovato-oblongae apice pubescenti saepe abrupte angustatae breviores. Flores ligulati plerumque 5, flavi, ligula late oblongi vel obovati, apice subtruncato denticulati, circ. 2 cm. longi. Paleae lineares, superne angustatae, inferne interdum 1–3-dentatae dentibus erectis, 5–6 mm. longae. Flores tubulosi tenuissimi, corolla tubo brevi (circ. 1.5 mm.) adjecto demum circ. 5.5–6 mm. longa. Achaenia cuneato-linearia, subplana, brunneo-atra, utraque facie 4-sulcata, superne sparsim erecto-setulosa, corpore circ. 5–5.5 mm. longa et supra circ. 1 mm. lata, apice biaristata aristis flavidis retrorsum hamosis 2–3 mm. longis.

Type specimen: Collected by *Howard Scott Gentry*, No. 1971, in meadow, Quicorichi, Río Mayo, State of Chihuahua, Mexico, October 7, 1935 (Field).

Distribution: Known only from type locality in the State of Chihuahua, Mexico.

Specimens examined: *Gentry* 1971 (type, Field).

153. **Bidens canescens** Bertol. Fl. Guat. (Nov. Comm. Act. Sc. Bonon. 4:) 431. 1840. Pl. LXXXVIII, figs. *l–s*.

Herba, verisimiliter perennis, humilis, adscendenti-erecta, circ. 2–4 dm. alta; caule tetragono, inferne glabro, superne albido-pubescenti. Folia petiolata petiolis circ. 0.5–1 cm. longis, petiolo adjecto 1.5–4 cm. longa, bipinnatisecta, circumambitu triangulata, trijuga, omnino dense albido-pubescentia, foliolis inferioribus cuneato-petiolulatis, foliolorum segmentis saepius late lineari-oblongis. Capitula solitaria, ramos superne foliis minimis bracteatos terminantia, radiata, pansa ad anthesin circ. 2.5–3 cm. lata et circ. 7–9 mm. alta. Involucri dense albido-pubescentis bracteae subaequales, exteriores circ. 8–10, lineari-oblongae, 4–7 mm. longae; interiores

lanceolatae. Flores ligulati circ. 8–10, flavi (vel exsiccati subalbidi), ligula anguste ovato-oblongi, apice plus minusve denticulati, circ. 1–1.4 cm. longi. Achaenia biaristata, aristis retrorsum hamosis.

Type specimen: Collected by *Joachim* (*Don Joachin* fide Hemsley, Biol. Centr. Amer. Bot. 4: 126. 1886) *Velásquez* on Volcán de Agua, Guatemala (Herb. Bertolonii, pro parte verisimiliter adhuc ad Zolam Pedrosam prope urbem tuscanam Bononiam in Italia).

Distribution: Guatemala on Volcán de Agua and very rare northward into State of San Luis Potosí, Mexico.

Specimens examined: *Virl. d'Aoust* 404, State of San Luis Potosí, Mexico, 1851 (Par.); *Maxon & Hay* 3690, alt. 3150–3,300 meters, Volcán de Agua, Guatemala, March 22, 1905 (U.S.); *Salvin & Godman*, summit of Volcán de Agua, 1861 (Kew); *Wawra* 326, region of Mexico (Mus. V.).

Dr. S. F. Blake examined Bertoloni's type which he found (July 21, 1925) in the Bertoloni Herbarium at Zola Pedrosa, near Bologna, Italy.[1] He states (in lit.) that he is satisfied that my determination of *Maxon & Hay* 3690 as *B. canescens* Bertol. is correct. Bertoloni's description was so full and detailed that the topotypes collected by Maxon and Hay, and by Salvin and Godman, could anyway be identified with his species without the slightest room for doubt. Authentic specimens with mature achenes are much to be desired, that the relationship of this species with its closest ally, *Bidens andicola* var. *decomposita* O. Ktze., may be investigated more extendedly.

EXPLANATION OF PLATE LXXXVIII, FIGS. *l–s*

Bidens canescens: *l*, flowering branch, ×0.57; *m*, small portion of same, enlarged to show pubescence, ×1.7; *n*, exterior involucral bract, ×3.41; *o*, interior involucral bract, ×3.41; *p*, ray floret, ×3.41; *q*, palea, ×3.41; *r*, disc floret ×3.41; *s*, upper portion of pistil, ×11.36; all from *Maxon* and *Hay* 3690, in Hb. U. S.

154. **Bidens serrulata** (Poir.) Desf. Tabl. Ecol. Bot. ed. 2: 130. 1815; Cat. Hort. Par. ed. 3: 186. 1829. Pl. CXXIX.

Coreopsis serrulata Poir. Encycl. Suppl. 2: 352. 1811.

Bidens grandiflora Balb. Cat. Hort. Taur. 19. 1812.

Bidens grandiflora Pers. ex Balb. op. cit. 18. 1813.

[1] The Bertoloni specimens of *Bidens*, etc., representing the *Flora Italica* are at the University of Bologna, but the North and Central American specimens are apparently still at Zola Pedrosa, or at least somewhere in the custody of Bertoloni's heirs. Cf. footnote under synonymy of *Bidens mitis*.

Coreopsis diversifolia Jacq. Eclog. Pl. 1: 80, *pl. 54.* 1811–1816.
Bidens quinqueradiata Zea fide Jacq. loc. cit.
Cosmea lutea Sims in Curtis's Bot. Mag. 41: *pl. 1689.* 1815.
Kerneria serrulata (Poir.) Cass. Dict. Sci. Nat. 51: 474. 1827.
Bidens diversifolia Hort. ex DC. Prodr. 5: 602. 1836; non Willd. ex DC. loc. cit.
Bidens serratulata Desf. ex DC. loc. cit.
Cosmos luteus (Sims) Gómez, Anal. Hist. Nat. Madr. 19: 275. 1890.
Bidens grandiflora var. *diversifolia* (Jacq.) O. Ktze. Rev. Gen. 3, pt. 2: 136. 1898.
Bidens grandiflora var. *serrulata* (Poir.) O. Ktze. loc. cit. ex synon. sed exclud. plantam Boliviae.[1]

Herba annua, erecta vel interdum adscendens; caule tereti vel ad basim quadrangulato, debili validove, plerumque glaberrimo (rarissime strigoso), purpurascenti, glaucescenti, 3–8 dm. alto. Folia glabra vel rariter sparsim hispida, petiolata petiolis 0.5–3 cm. longis, petiolo adjecto 0.3–1 dm. longa, variabilia; nunc 2–3-pinnata, segmentis linearibus vel lanceolatis, integris, acutis, indurato-apiculatis, crasso-marginatis, parce ciliatis; nunc pinnatim 3–5- (9-) partita, foliolis lanceolatis vel ovato-lanceolatis, acutis vel acuminatis, serratis vel inciso-dentatis, parce ciliatis, dentibus indurato-apiculatis. Capitula radiata, pansa ad anthesin 3–6 cm. lata et 9–13 mm. alta, pedunculata pedunculis 0.4–1.5 (–2) dm. longis. Involucri basis hispida; bracteis exterioribus 7–10, late linearibus, glabris, 6–9 mm. longis, plerumque patentibus vel reflexis; interioribus linearilanceolatis, extrinsecus hispidissimis, 7–11 mm. longis. Flores ligulati 4–7, plerumque 5, aurei, ligula ovati vel obovato-lanceolati, apice subintegri vel denticulati, 1.5–3 cm. longi; tubulosi aurantiaci. Achaenia plantarum normalium capitulorum numerosa (40–60), dimorpha; interiora tenuiter linearia, saepe apicem versus attenuata, tetragona, biaristata aristis aurantiaco-flavidulis et retrorsum hamosis, corpore nigra (vel ad apicem flavida), tuberculato-strigosa (praecipue supra), 7–16 mm. longa; marginalia clavata, cuneato-linearia, tetragona, glabrata, exaristata, rufo-badia, 4–5 mm. longa.

Type specimen: No particular type cited by Poiret, but several authentic original specimens are extant (Par.; vide infra).

Distribution: From State of Zacatecas southeastward to states of Oaxaca and Chiapas, Mexico; not common, however, outside of the State of Mexico.

[1] Kuntze's specimen (ipse legit) came from 2,100 meters alt., Santa Rosa, Bolivia, April 1, 1892. It is still extant (N.Y.) and is true *Bidens andicola* H.B.K.

Specimens examined: *Alamán*, Mexico, 1825 (Del.); *Berlandier* 1198, Valley of Mexico, State of Mexico, October, 1827 (Brit.; Del., 3 sheets); *E. Bourgeau* 954, borders of fields near San Nicolás, State of Mexico, September 27, 1865 (Berl.; Boiss.; Cop.; Gray; Kew; Mun.; Par., 5 sheets; Petrop., 2 sheets; U.S.); *idem* 956, eodem loco et tempore (Berl.; Boiss; Cop.; Del.; Gray; Kew, 2 sheets; Par., 5 sheets); *idem* 1079, borders of corn fields, on mountain above San Nicolás, October 26, 1865 (Kew; Par., 4 sheets); *Carl Ehrenberg* 438, between Mineral del Monte and Huajalote, Hidalgo (Berl., 2 sheets); *G. J. Graham* 49, Mexico (Kew); *Ludwig Hahn* 280, Tlalpam, State of Mexico, 1865 (Par.); *idem* 1079, San Nicolás, State of Mexico, October 26, 1865–1866 (Kew; Petrop.; Webb); cult. in *Hort. Basil.*, July, 1838 (N.Y.); cult. in *Hort. Par.*, August 5, 1813 (Par.), August, 1823 (Berl., ex herb. Kunthii), etc.; *E. W. Nelson* 1412, alt. 2,250–2,850 meters, southwest of Oaxaca, State of Oaxaca, September 10–20, 1894 (U.S.); *idem* 1561, alt. 1,950–2,340 meters, Valley of Oaxaca, State of Oaxaca, October 3, 1894 (U.S.; forma plus gracilis); *C. R. Orcutt* 4271, Churubusco, State of Mexico, October 4, 1910 (Field); *C. G. Pringle* 3661, Flor de María, State of Mexico, October 18, 1890 (Gray); *idem* 4313, Sierra de las Cruces, State of Mexico, October 23, 1892 (Berl., 2 sheets; Boiss.; Brit.; Del., 2 sheets; Field; Kew; Mo.; Mun.; Mus. V.; Par.; Phila.; U.V., etc.); *idem* 11488, alt. 2,850 meters, Tres Marías Mts., Morelos, November 7, 1903 (Berl.; Field; Kew); *C. A. Purpus*, Mt. Ixtaccihuatl, 1903 (Calif.); *idem* 1545, fields, Pachuca, Hidalgo, September, 1905 (Calif.; Field; Mo.); *idem* 1546, fields, Salto de Agua, southern Mexico, October, 1905 (Field; Mo.); *J. N. Rose & J. H. Painter* 7844, near Tultenango, State of Mexico, October 13, 1903 (U.S.); *Schaffner* 252, Valley of Mexico, State of Mexico (Kew); *C. J. W. Schiede*, Angangueo, Michoacán, November, 1829 (Berl.); *idem*, near Angangueo, October, 1830 (Berl., 2 sheets); *idem*, cold region, Mexico, October, 1835 (Berl.); *Alb. Schmitz* 394, mountains near City of Mexico, State of Mexico, 1856 (Brit.; Mus. V., 2 sheets); *Eduard & Caecilie Seler* 560, near Zacatecas, State of Zacatecas, November, 1887 (Berl.); *iidem* 1303, Villa Lerma, State of Mexico, October 14, 1895 (Berl.; Gray; Kew); *C. L. Smith* 299, alt. 2,100–2,400 meters, Sierra de San Felipe, Oaxaca, 1894 (Mo.; U.S.); *L. C. Smith* 224, alt. 2,100 meters, mountains, Las Sedas, Oaxaca, October 8, 1894 (Gray); *Ralph Tate*, Mexico (Kew); *Uhde* 445, 625, 631, and 633, Mexico (Berl.).

In most herbarium determinations of this species (cf. Bot. Gaz. 85: 11. 1928), I have employed the widely accepted name *Bidens*

grandiflora Balb., a name going back to 1812. The trivial name *serrulata* was employed by Poiret one year earlier, and must be taken up. Certain authentic specimens of Poiret's species are extant at Paris, where this plant once was cultivated for at least several years. One of them ("Du Jardin des Plantes de Paris. 5 Aout 1813") was photographed by me. They are specifically the same as the plants cultivated by the younger Jacquin in 1810 from seed sent from Paris (Mus. Hist. Nat., located in the Jardin des Plantes), under the name *Bidens quinqueradiata* Zea and named by Jacquin, *Coreopsis diversifolia*. They are matched specifically also by the type illustration of *Cosmea lutea* Sims.[1]

The cultivated specimens found in herbaria are mostly lower, more delicate, and less erect, giving an illusory appearance of dissimilarity to the spontaneous form. Poiret's description was based upon one of Desfontaines' specimens. Like many of the descriptions written in those days, it was inadequately drawn. The fruit characters were omitted. We read that the plant described is small, with petioles and lower part of stem pilose, also with ovate leaves. These last were not described as compound.

DeCandolle (loc. cit.), evidently relying solely upon Poiret's description,[2] maintained *B. grandiflora* apart from *B. serrulata* (Poir.) Desf. The *Index Kewensis* (1: 617. 1895), however, equates *Coreopsis serrulata* Poir. and *Bidens grandiflora* Balb. Furthermore, we are bound to consider the very careful and extended description of the Poiret species drawn up by Cassini (loc. cit.) when publishing the new combination *Kerneria serrulata*. Cassini had been in Paris, at the center of Desfontaines' and Poiret's activities. He amplified his description from living material growing in the Royal Garden of Paris, where Desfontaines had worked. His description fitted very well the average plants of *B. grandiflora* Balb.

Upon the grounds of priority the name *B. serrulata* takes precedence, going back to some time in the year 1811 prior to November 29,[3] while *B. grandiflora* was not published until 1812. The exact date for *Coreopsis diversifolia* Jacq. I do not know. The page number and plate number would seem clearly to indicate a date later than 1811. At all events, the existence of a *B. diversifolia* Willd.

[1] A species native to Mexico, cultivated from seeds obtained from the Madrid Botanical Garden; drawing made in 1812. Stem purplish at base in illustration.

[2] "Ab hac (*B. grandiflora* Balb.) ex descr. videtur diversa *Coreopsis serrulata* Poir. suppl. 3 [sic] p. 352 etiamsi a cl. Desf. admissa."

[3] Fide Bibl. Franc. 83. Nov. 29, 1811: cf. Journ. Bot. 44: 319. 1906.

(ex DC. loc. cit. No. 55) might well preclude the acceptance of the combination *B. diversifolia* (Jacq.) Hort. ex DC. (loc. cit. No. 59).

EXPLANATION OF PLATE CXXIX

Bidens serrulata: a, flowering and fruiting branch, ×0.68; *b*, *c*, *d*, various cauline leaves, ×0.68; *e*, exterior involucral bract, ×2.72; *f*, interior involucral bract, ×2.72; *g*, ray floret, ×2.72; *h*, palea, ×2.72; *i*, disc floret, ×2.72; *j* (outer), *k* (inner) achenes, ×2.72; *a*, *b*, *e–k*, from *Pringle* 11488, in Hb. Field; *c*, *d*, from *Pringle* 4313, in Hb. Field.

155. **Bidens Geraniifolia** Brandegee, Univ. Calif. Publ. Bot. 6: 76. 1914. Pl. CXXX, figs. *j–o*.

Herba, probabiliter perennis et 5–9 dm. alta; caulibus tenuibus, ramosis, glabris. Folia petiolata petiolis ciliatis 1–2.5 cm. longis, petiolo adjecto 6–9 cm. longa, bipinnatisecta; segmentis late linearibus vel elliptico-linearibus, membranaceis, acriter apiculatis, parce ciliatis, 2–4 vel etiam –5.5 mm. latis. Capitula solitaria, longe tenuiterque pedunculata pedunculis ± 1.5 dm. longis, radiata, pansa ad anthesin 3–4.5 cm. lata et 7–10 mm. alta. Involucri bracteae subaequales; exteriores 10–14, glabrae, lineares, inferne sensim angustatae, apice subacute mucronulatae, 7–10 mm. longae et 0.9–1.2 mm. latae; interiores lanceolatae, glabratae. Flores ligulati 7–10, sicci albido-flavidi, ligula oblanceolati, apice 3–denticulati, 1.4–1.8 cm. longi. Achaenia juniora plana, biaristata aristis retrorsum hamosis.

Type specimen: Collected by *Carl Albert Purpus*, No. 6679, in the high region of Cerro del Boquerón, State of Chiapas, Mexico, September, 1913 (Calif.).

Distribution: Known only from type locality, Cerro del Boquerón, State of Chiapas, Mexico.

Specimens examined: *Purpus* 6679 (type, Calif.: cotypes, Brit.; Field; Mo.).[1]

EXPLANATION OF PLATE CXXX, FIGS. *j–o*

Bidens Geraniifolia: j, flowering branch, ×0.62; *k*, exterior involucral bract, ×3.1; *l*, interior involucral bract, ×3.1; *m*, ray corolla, ×3.1; *n*, palea, ×3.1; *o*, disc floret, ×3.1; all from cotype, in Hb. Field.

[1] *Bidens triplinervia* var. *macrantha* (Wedd.) Sherff also occurs in the State of Chiapas and at times (e.g., *Ghiesbreght* 533, Hb. Gray) produces leaves deceivingly like those of *B. Geraniifolia*. It is possible that in earlier herbarium determinations I may have referred plants of that variety erroneously to *B. Geraniifolia*.

156. **Bidens chiapensis** Brandegee, Univ. Calif. Publ. Bot. 6: 76. 1914. Pl. CXXX, figs. *a–i*.

Glabra, verisimiliter perennis; caule subtereti vel parce tetragono, purpureo-subnigro, forsan 1 m. alto (et forsan scandenti), internodiis longis quam foliis saepe multo longioribus. Folia petiolata petiolis tenuibus 1–3 cm. longis, petiolo adjecto 4–8 cm. longa, tripartita (vel summa indivisa); foliolis membranaceis, ovato-acuminatis vel interdum lanceolato-acuminatis, minute ciliatis, subtus multo pallidioribus. Capitula perpauca, saepius 1–3 in unico ramo (an caule?), pedunculata pedunculis caules ramosve terminantibus et 0.4–1.6 (–2.4) dm. longis, radiata, pansa ad anthesin ±2.5 cm. lata et ±1.2 cm. alta. Involucri bracteae exteriores numerosae 12–20, lineares, apice acutae, ciliatae, 0.8–1.3 cm. longae, quam interiores oblongo-lanceolatae paulo longiores. Flores ligulati circ. 8, flavi vel albido-flavi, anguste elliptici, apice dentati, disco paulo longiores. Achaenia linearia, glabra, acute tetragona, supra demum attenuata, nigra, biaristata (rarissime quadriaristata) aristis retrorsum hamosis 2–4 mm. longis, corpore circ. 9 mm. longa.

Type specimen: Collected by *Carl Albert Purpus*, No. 6945, at high altitude of the Cerro del Boquerón, State of Chiapas, Mexico, October, 1913 (Calif.).

Distribution: State of Chiapas to State of Michoacán, southern Mexico.

Specimens examined: *Ghiesbreght* 551, "Chiapas, etc.," 1864–1870 (Boiss.; Brit.; Kew; Mo.); *C. A. Purpus* 6668, Chiapas, 1913 (Field); *idem* 6945 (cotypes, Brit.; Field); *Schiede*, near Angangueo, Michoacán, October, 1830 (Berl.); *L. C. Smith* 857, alt. 2,250 meters, in mountains, Telixtlahuaca, Oaxaca, October 18, 1895 (Gray).

The plant of Ghiesbreght (No. 551) was referred erroneously by Asa Gray (Proc. Amer. Acad. 19: 16. 1883) to *Bidens Dondiaefolia* Less. It matches the type of *B. chiapensis* very precisely. A distinguishing character of the species is the large number (12–20) of narrowly linear exterior involucral bracts.

EXPLANATION OF PLATE CXXX, FIGS. *a–i*

Bidens chiapensis: a, flowering branch, ×0.62; *b*, exterior involucral bract, ×3.1; *c*, interior involucral bract, ×3.1; *d*, *e*, ray corollas, ×3.1; *f*, palea, ×3.1; g, disc floret, ×3.1; *h*, *i*, achenes, ×3.1; *a–d*, *f–h*, from cotype, in Hb. Field; *e*, from *Ghiesbreght* 551, in Hb. Mo.; *i*, from *L. C. Smith* 857, in Hb. Gray.

157. **Bidens Ostruthioides** (DC.) Schz. Bip. in Seem. Bot. Voy. Herald 308. 1852–1857. Pl. CXXXI.

Delucia Ostruthioides DC. Prodr. 5: 633; Deless. Icon. Select. Plant. 4: *pl. 40.* 1839.

Bidens guatemalensis Klatt, Bot. Jahrb. 8: 44. 1887.

Folia principalia tripartita, foliolis ovatis vel rhomboideo-ovatis. *B. Ostruthioides* sensu stricto.

Folia acerrime bipinnatisecta vel plus minusve biternatisecta, foliolis segmentisve cuneato-lanceolatis.....var. *β. costaricensis.*

Herba e radice lignea perennis, plus minusve decumbens, saepius glabra; caule subtereti, subsimplici ramosove, infra ligneo, 0.3–1.5 m. (vel ultra) longo. Folia petiolata petiolis inferne hispido-ciliatis 1.5–2.5 cm. longis, petiolo adjecto plerumque subaequaliter 4.5–6.5 cm. longa, membranacea, infra multo pallidiora, tripartita (vel saepe summa indivisa); foliolis ovatis vel rhomboideo-ovatis, ciliatis, utrinque acute grosseque dentato-serratis; dentibus utroque latere 1–5, indurato-mucronatis. Capitula solitaria, longe tenuiterque pedunculata pedunculis plerumque 1–2.2 dm. longis, radiata, pansa ad anthesin 3–5 cm. lata et 0.9–1.2 cm. alta. Involucrum plus minusve glabrum, bracteis subaequalibus; exterioribus 5–7, foliaceis, lanceolatis vel late linearibus, acutis, plerumque ciliatis, 0.6–1.2 cm. longis; interioribus lanceolatis vel ovato-lanceolatis, aurantiacis, membranaceis. Flores ligulati circ. 5, flavi, ligula obovato-lanceolati, apice plerumque 3-dentati, styliferi fertilesque, 1.5–2.2 cm. longi. Achaenia disci et radiorum obcompressa, pallide rufo-badia, linearia, obtuse triangulata, glabra, corpore 7–9 mm. longa, triaristata aristis retrorsum hamosis et 3.5–5 mm. longis (rariter biaristata, saepe imperfecte quadriaristata, arista quarta brevi circ. 1.2 mm. longa).

Type specimen: Collected by *Jean Luis Berlandier*, No. 920, in mountains about the City of Mexico, Federal District, Mexico, October–November, 1827 (Del.).

Distribution: States of Michoacán and Vera Cruz, southern Mexico, southeastward into Guatemala.

Specimens examined: *Alamán*, Mexico (Gray); *Baites*, Mexico, 1846 (Kew); *Berlandier*, in mountains about City of Mexico, Federal Distr., September (U.V.); *idem* 920 (type, Del.: cotypes, Berl.; Boiss.; Brit.; Mus. V.; Par., 3 sheets; Webb); *Bourgeau* 835, forest of the montane desert near Santa Fé, Federal Distr., Mexico, July, 1865 (Kew; Par., 3 sheets); *idem* (similiter) 835, forest of Desierto Viejo near City of Mexico, September 7, 1865 (Berl.; Boiss.; Cop.;

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Del.; Gray; Kew); *idem* (similiter) 835, forest at San Nicolás, near City of Mexico, October 26, 1865 (Kew; Par., 2 sheets); *C. C. Deam* 20, "decumbent vine, 2–5 ft. high," foothill of Mt. Ixtaccihuatl, Mexico, 1899 (Gray); *Ghiesbreght* 107, Chiapas (Gray); *idem* 151, temperate region, mountains of the Mexican Plateau, August, 1843 (Par.); *idem* 555, Chiapas or in region of (Boiss.; Brit.; Mo.); *C. J. Graham* 48, Mexico, 1830 (Brit.; Kew); *F. C. Lehmann* 1560, Guatemala, June 16, 1882 (type collection of *Bidens guatemalensis* Klatt; Boiss.; Gray; Kew; U.S.); *Liebmann* 644, between San Andrés and San Miguel, eastern central Mexico, October, 1842 (Cop., 2 sheets); *Mackenzie*, Mexico (Kew); *Fred. Müller* 1950, City of Vera Cruz to Mt. Orizaba, Vera Cruz, 1853 (Kew; Mus. V.); *E. W. Nelson* 1333, alt. 2,250–2,850 meters, 18 miles southwest of Oaxaca, State of Oaxaca, September 10–20, 1894 (U.S.); *idem* 1403, eodem loco et tempore (U.S.); *idem* 1725, alt. 2,250–3,120 meters, near Reyes, Oaxaca, October 17, 1894 (U.S.); *idem* 3658, alt. 3,300 meters, mountains near Hacienda Chaucol, Guatemala, January 2, 1896 (U.S.); *C. R. Orcutt* 3517, Contreras, Federal Distr., Mexico, August 9, 1910 (Field; Kew; Mo.); *C. G. Pringle* 3596, hills of Pátzcuaro, Michoacán, November 8, 1890 (Gray); *idem* 6598, alt. 2,550 meters, Sierra de Ajusco, Federal Distr., Mexico, October 23, 1896 (Berl., 2 sheets; Boiss.; Brit.; Calif.; Can.; Carn.; Del., 2 sheets; Field; Kew; Mo., 2 sheets; Mun.; Mus. V.; Par., 2 sheets; Phila.; U.V.); *C. A. Purpus*, Mt. Ixtaccihuatl, February, 1903 (Calif.); *idem* 1544 p.p., moist, shady woods at alt. 2,100–2,400 meters, eodem loco, October, 1905 (Brit.; Calif.; Field; Mo.; U.V.); *W. Schaffner* 187, Valley of Mexico (Kew; Par., 2 sheets); *idem* 228, eodem loco (Kew); *idem* 232*a*, alt. 2,400 meters, Mt. Popocatapetl, Mexico (Berl.; Gray; hic numerus in Herb. Par. flores radiatos neutros et folia atypica habet, itaque hybrida forsitan cum *B. triplinervia* videtur); *Schiede*, near Angangueo, Michoacán, November, 1829 (Berl.); *idem*, eodem loco, October, 1830 (Berl., 3 sheets); *Alb. Schmitz* 395, Mexico (Brit.; Mus. V., 4 sheets); *Eduard & Caecilie Seler* 2928, forested banks of Lake Atitlán, Panajachel, Dept. Sololá, Guatemala, June 3, 1896 (Berl.).

DeCandolle made this the type species of his genus *Delucia*, which he distinguished from *Bidens* by the character of the fertile ray flowers. Later Schultz Bipontinus (loc. cit.; cf. Flora 39: 359. 1856) transferred it to *Bidens*, where it has been placed almost universally by other botanists. Klatt described *B. guatemalensis* from Lehmann's No. 1560, said by him to have biaristate achenes, but only a part of the achenes on the Lehmann plant in the Boissier

Herbarium are biaristate, the others being triaristate. The style branches of the disk flowers, moreover, are blunt-tipped as in the type material of *B. Ostruthioides* and the two forms are identical in other respects as well.

Bidens Ostruthioides var. *β.* **costaricensis** (Benth. ex Oerst.) Sherff, Bot. Gaz. 88: 298, *pl. 21.* 1929. Pl. CXXXII.

Bidens costaricensis Benth. ex Oerst. Kjoeb. Vid. Medd. 1852: 94. 1852.

Bidens irazuensis Calv. & Calv. Year Costa Rican Nat. Hist. xvi, 137 (plate), and 140. 1917.

Folia petiolata petiolis inferne hispido-ciliatis 1–4 cm. longis, petiolo adjecto 5–12 cm. longa, acerrime bipinnatisecta vel plus minusve biternatisecta, foliolis segmentisve cuneato-lanceolatis, inciso-dentatis, dentium apice induratis et saepe mucronatis, margine sparsim ciliatis; supra ad venas plerumque minutissime creberrimeque glanduloso-setulosis, aliter glabris, in speciminibus exsiccatis saepe nigrescentibus; infra pallidioribus; lateralibus decurrentibus. Floribus fructibusque a specie non differt.

Type specimen: Collected by *Anders Sandöe Oersted*, at altitude of 600–1,500 meters, on Mt. Aguacate, Costa Rica, November, 1846 (Cop.).

Distribution: State of Oaxaca, Mexico, southeastward into Costa Rica.

Specimens examined: *Dr. & Mrs. P. P. Calvert*, forest below cinders, Volcán Irazú, Costa Rica, April 2, 1910 (Penn.); *C. Conzatti* 2090, alt. 2,000 meters, Distr. Teotitlán, Oaxaca, December 10, 1907 (Field); *C. W. Dodge* 3439, in oak forest on the upper slopes, Volcán Irazú, Cartago Prov., Costa Rica, August 18, 1925 (Gray); *C. Hoffmann* 105, higher mountain forest of Volcán Irazú, May 6, 1855 (Berl.); *Otto Kuntze*, alt. 2,100 meters, Cartago, Costa Rica, June 24, 1874 (N.Y.); *F. C. Lehmann* 119, alt. 1,950 meters, climbing to 5 meters, among shrubs and bamboos, west slopes of Volcán Irazú, March 28, 1878 (Mus. V.; forma petiolis infra medium spiralibus claviculatisque); *idem* 1787, alt. 800 meters, growing up to 1.5 meters, in moist places, Río Blanco, Costa Rica, March 18, 1882 (Boiss.; Gray; Kew, 2 sheets); *A. S. Oersted*, alt. 600–1,500 meters, Mt. Aguacate, Costa Rica, November, 1846 (type, Cop.); *idem*, San José, Costa Rica, 1845–1848 (Cop., 2 sheets); *idem*, Volcán Irazú, etc., Costa Rica (ex herb. Benth. in Kew); *H. Pittier* 742, alt. 2,800–3,200 meters, in oak forests of Volcán Irazú, December 12, 1888 (Gray);

BIDENS BUCHNERI (Klatt) Sherff

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idem 14070, alt. 2,300 meters, Laguna del Reventado, Volcán Irazú, January 1, 1901 (Gray); *C. G. Pringle* 5848, alt. 2,700 meters, Sierra de Clavellinas, Oaxaca, October 26, 1894 (Gray; Mo.); *C. A. Purpus* 3109, Cerro Verde, Oaxaca (vicinity of San Luis Tultitlanapa, Puebla, near Oaxaca), July, 1908 (Berl.; Brit.; Calif.); *C. L. Smith* 357, alt. 2,700 meters, Sierra de Clavellinas, Oaxaca, October 16–19, 1894 (Mo.; N.Y.; U.S.).

EXPLANATION OF PLATE CXXXI

Bidens Ostruthioides: a, h, flowering branches, ×0.66; *b, j,* exterior involucral bracts, ×4.62; *c, k,* interior involucral bracts, ×4.62; *d, l,* ray florets, ×2.64; *e, m,* paleae, ×4.62; *f, n,* disc florets, ×4.62; *g, o,* upper portions of pistils, ×9.9; *i,* cauline leaf, ×0.66; *p* (ray), *q* (disc), achenes, ×4.62; *a–g,* from *Lehmann* 1560 (type collection of *Bidens guatemalensis* Klatt) in Hb. Gray; *h, j–o,* from *Purpus* 1544, in Hb. Field; *i,* from specimen presented by De Candolle to Hb. Par.; *p, q,* from *Pringle* 6598, in Hb. Field.

EXPLANATION OF PLATE CXXXII

Bidens Ostruthioides var. *costaricensis: a, b,* flowering and subfruiting branches, ×0.64; *c,* exterior involucral bract, ×3.84; *d,* interior involucral bract, ×3.84; *e,* ray floret, ×2.56; *f,* palea, ×3.84; *g,* disc floret, ×3.84; all from sheet of assorted *Oersted* materials from Mt. Irazú, Mt. Aguacate, etc., in Bentham's herbarium in Hb. Kew.

158. **Bidens bicolor** Greenm. Proc. Amer. Acad. 39: 114. 1903. Pl. CXXXIII.

Herba erecta, ramosa caulibus ramisque hirsuto-pubescentibus vel fere glabris, 4–7 dm. alta. Folia petiolata petiolis 0.5–3 cm. longis, petiolo adjecto usque ad 8 cm. longa, 3–5-partita; foliolis ovatis vel ovato-lanceolatis, apice acutis vel etiam acuminato-acutis, serratis, sparsim pubescentibus vel glabris, infra pallidioribus, membranaceis, 1.5–5 cm. longis et 0.5–2 cm. latis. Capitula non numerosa, pedunculata pedunculis tenuibus usque ad 10 cm. longis, radiata, pansa ad anthesin 2.5–7 cm. lata et 7–13 mm. alta. Involucri plus minusve hirsuti bracteae exteriores circ. 8–10, lineari-oblongae, plerumque patentes, 5–8 mm. longae; interiores lanceolatae, plerumque breviores. Flores ligulati 5 vel 6, basi plerumque purpurei alibi flavi, ligula elliptico-oblanceolati, apici interdum minute denticulati, 1.5–3 cm. longi. Achaenia (immatura) linearia, supra sensim angustata, apicem versus erecto-setosa, biaristata aristis retrorsum hamosis.

Type specimen: Collected by *Cassiano Conzatti* and *V. González*, No. 1008, at altitude of 1,750 meters, State of Oaxaca, Mexico, July–August, 1900 (Gray).

Distribution: States of Oaxaca and Chiapas, southern Mexico.

Specimens examined: *Conzatti & González* 1008 (type, Gray); *iidem* 1009, eodem loco et tempore (Gray); *Ghiesbreght* 781, on cultivated land, Chiapas, etc., Mexico, July–August (Gray).

A scantily represented and poorly understood species.

EXPLANATION OF PLATE CXXXIII

Bidens bicolor: a, upper, main part of plant, ×0.7; *b*, flowering branch, ×0.7; *c*, exterior involucral bract, ×4.2; *d*, interior involucral bract, ×4.2; *e*, ray floret (shaded at base to show spot of purplish color), ×2.8; *f*, palea, ×4.2; *g*, disc floret, ×4.2; *h*, achene, ×4.2; all from *Conzatti* and *González* 1009, in Hb. Gray.

159. **Bidens Holstii** (O. Hoffm.) Sherff, Bot. Gaz. 76: 79. 1923. Pl. CXXXIV.

Coreopsis Holstii O. Hoffm. in Engler, Pflanzenw. D. Ost.-Afr. C: 415. 1899.

Achaenia plurime exaristata . . . . . *B. Holstii* sensu stricto.

Achaenia plurime aristata aristis supra retrorsum 1–3-hamosis. var. *β. rupestris*.

Herba perennis, undique glanduloso-puberula, circ. 1 m. alta; ramis obtuse tetragonis, speciminibus siccis dense brunneo-viridibus. Folia petiolata petiolis circ. 1–1.5 cm. longis, petiolo adjecto 5–9 cm. longa, pinnatipartita, circumambitu oblongo-ovata vel oblongo-lanceolata; segmentis principalibus saepius circ. 7 vel 9, membranaceis vel crassiusculis, atro-punctulatis, grosse crenatis vel sinuatis, dentium apice nitido-cartilagineis, infra pallidioribus. Capitula pauca, ad apices ramorum solitaria, radiata, pansa ad anthesin 4–5.5 cm. lata et 1.4–1.7 cm. alta. Involucri bracteae exteriores (in duabus seriebus) 10–14, oblongae vel rarius ovatae, dense glanduloso-pubescentes, apice obtusae, 8–10 mm. longae; interiores subaequilongae, angustiores, tenuiter membranaceae, non nisi ad apicem puberulae. Flores ligulati 8–10, lutei, ligula elliptici vel oblanceolati, apice minute circ. 3-dentati. Achaenia quam paleae multo breviora, plana, oblonga lineariave, utraque facie circ. 8-striata, margine (moderate) et apice (dense et pectinatim) erecto-setosa, 4–6 mm. longa et 0.7–1.2 mm. lata, apice exaristata vel raro pauca biaristata aristis tenuibus et erecto-setosis.

Type specimen: Collected by *C. Holst,* No. 76, in sunny places of the higher mountains, mountain steppe, Usambara, German East Africa, October, 1891 (Berl.).

Distribution: District of Usambara, German East Africa.

Specimens examined: *Karl Braun* 2820, Kingo-Kwai, western Usambara, August 21, 1909 (Berl); *idem* 2857, eodem loco et tempore (Berl.); *Holst* 76 (type, Berl.); *Albrecht Zimmermann* 1776, Hermannsplatte, western Usambara, February, 1908 (Berl.).

Hoffmann's type in Berlin consists of three flowering specimens mounted upon one sheet. They lack mature or even submature achenes. At first they were determined by him as *Coreopsis Grantii* Oliv. (*Bidens Grantii* Sherff), but later he crossed out this determination and substituted the new name *C. Holstii.* His description of the achenes ("Achaeniis juvenilibus alatis") was of necessity drawn from the unripened ovaries. The winged character assigned by him to the young achenes is not manifest on my examination of them. They naturally are thin and delicate toward the edges, but this is true of the achenes of many typical *Bidens* species when equally young. Fortunately there since have been collected by Braun and by Zimmerman additional specimens from the type district, Usambara. These match the type very closely, and two excel it in having mature achenes. The achenes are linear, unwinged, 3–6 mm. long, flattened, antrorsely setose upon the margins and at the apex, exaristate or with two setae very slightly larger than the rest and representing minute aristae. Hoffmann described the aristae as very short ("aristis 2 brevissimis"), but, as may be seen from my plate, *fig. g,* the ovarian aristae of his type, when compared with the body of the ovary, are not very short. The species bears a strong habital resemblance to *Bidens Grantii* (Oliv.) Sherff and in lesser degree to *Coreopsis pinnatipartita* O. Hoffm. From the latter it differs in its setose, exalate achenes. From *B. Grantii* it appears to differ mainly in having the achenes exaristate or only shortly aristate (a character here of somewhat uncertain value) and in the nature of its pubescence.

Bidens Holstii var. β. **rupestris** Sherff, Bot. Gaz. 90: 393. 1930. Pl. CXXXV.

Bidens rupestris Sherff, op. cit. 76: 144. 1923.

A specie achaeniis regulariter bi- (rariter tri-) aristatis aristis infra plerumque spinulis erecte munitis, supra retrorsum 1–3-hamosis vel rariter nudis 2–3.5 mm. longis differt.

Type specimen: Collected by *Carl Uhlig*, No. 750, on moss-covered, stony, newly formed volcanic cliffs, "im filzigdichten mannshohen Busch," at altitude of 2,400 meters, northeast side of Meru Mountain, German East Africa, November 27, 1901 (Berl.).

Distribution: Known only from vicinity of Mt. Meru, northeastern German East Africa.

Specimens examined: *Uhlig* 750 (type, Berl.).

EXPLANATION OF PLATE CXXXIV

Bidens Holstii: a, flowering branch, ×0.65; *b*, portion of leaf, ×3.25; *c*, exterior involucral bract, ×3.25; *d*, interior involucral bract, ×3.25; *e*, ray corolla, ×1.95; *f*, palea, ×3.25; *g*, disc floret, ×3.25; *h*, *i*, achenes, ×3.25; *a–g*, from type; *h*, *i*, from *Braun* 2857, in Hb. Berl.

EXPLANATION OF PLATE CXXXV

Bidens Holstii var. *rupestris: a*, flowering branch, ×0.63; *b*, exterior involucral bract, ×2.53; *c*, interior involucral bract, ×2.53; *d*, ray floret, ×1.9; *e*, palea, ×2.53; *f*, disc floret, ×2.53; *g*, immature achene, ×3.79; all from type.

160. **Bidens kamerunensis** Sherff, Bot. Gaz. 76: 148. 1923. Pl. CXXXVI.

Herba pubescens, verisimiliter perennis, simplex forsitan interdum ramosa, 1–1.5 m. alta. Folia petiolata petiolis latis 0.5–1.5 cm. longis, petiolo adjecto 4–10 cm. longa, 3- (rarius 5-) partita; foliolis lanceolatis, irregulariter crenato-dentatis dentibus abrupte subcalloso-apiculatis, foliolis lateralibus usque ad 2.5 cm. longis, terminali usque ad 7 cm. longo. Capitula pauca, pedunculata pedunculis subrobustis usque ad 8 cm. longis, radiata, pansa ad anthesin 6–7 cm. lata et 1.2–1.8 cm. alta. Involucri bracteae dense sed breviter hispidae, exteriores 13–16, lineari-lanceolatae, supra sensim attenuatae, inconspicue apiculatae, 1.2–1.5 cm. longae, ad medium plus minusve reflexae; interiores lanceolatae vel lineares, interdum breviores. Flores ligulati 14–16, lutei, ligula late elliptico-lineares, apice minute denticulati, 2.5–3.5 cm. longi. Paleae anguste lineares, achaenia superantes. Achaenia atra, valde obcompressa, exalata, antrorsum hispida vel inferne glabrata, circ. 11–13 mm. longa et 2 mm. lata, saepe biaristata aristis tenuibus, nudis, usque ad 1.5 mm. longis.

Type specimen: Collected by *C. Ledermann*, No. 5461, at altitude of 1,200–1,400 meters, Mao Barkedje, Mt. Gendero, Kamerun, October 6, 1909 (Berl.).

Distribution: Known only from type locality on Mt. Gendero, Kamerun.

Specimens examined: *Ledermann* 5461 (type, Berl.); *J. McDonald* 1003, alt. 1,800 meters, gray sandy loam, Solai, Kikuyu region, British East Africa, September, 1925 (Kew; forma foliis 5–7-partitis; achaeniis submaturis).

EXPLANATION OF PLATE CXXXVI

Bidens kamerunensis: a, flowering branch, ×0.63; *b*, lower surface of portion of leaf, enlarged to show pubescence, ×2.5; *c*, exterior involucral bract, ×2.5; *d*, interior involucral bract, ×2.5; *e*, ray corolla, ×1.25; *f*, palea, ×2.5; *g*, palea (showing rolling-over of edges characteristic of older paleae, the dilated tips of which surpass at least submature achenes), ×2.5; *h*, disc floret, ×2.5; *i*, achene, ×2.5; all from type.

161. **Bidens Grantii** (Oliv.) Sherff, Bot. Gaz. 59: 309. 1915.

Coreopsis Grantii Oliv. Trans. Linn. Soc. 29: 98, *pl. 65*. 1873.

a. Foliorum segmenta ultima plus minusve ovata.

b. Folia subsessilia, 3.5–5 cm. longa. . . . . *B. Grantii* sensu stricto.

b. Folia tenuiter petiolata petiolis usque ad 4 cm. longis, petiolo adjecto 1–1.7 dm. longa . . . . . var. *β. Stapfii.*

a. Foliorum segmenta ultima plus minusve oblongo-linearia.

b. Foliorum segmentum terminale elongato-angustissimum 1.5–2 cm. longum et circ. 2–3 mm. latum; achaeniis corpore circ. 4 mm. longis. . . . . var. *δ. Scaettae.*

b. Foliorum segmentum terminale brevius latiusque; achaeniis corpore 5–8 mm. longis . . . . . var. *γ. Dawei.*

Herba annua forsitan perennis, erecta, 6–12 dm. alta; caule superne ramoso, laxe piloso-pubescenti, subtetragono. Folia subsessilia, circumambitu anguste deltoidea, 3.5–5 cm. longa et basi 2.5–3.5 cm. lata, bipinnatifida, lobulis ovatis obtusiusculis integris paucidentatisve mucronulatis supra scabrido-puberulis subtus piloso-pubescentibus. Capitula breviter pedunculata pedunculis 2.5–4 cm. longis, radiata, pansa ad anthesin 4–5 cm. lata et ±1 cm. alta. Involucri hirto-pilosi bracteae exteriores 8–10, lineares, apiculatae, ±6 mm. longae; interiores multo latiores, vix longiores. Flores ligulati circ. 8, flavi, ligula oblongo-elliptici, apice subintegri, 2–2.5 cm. longi. Paleae lineares, apice coloratae, achaenio longiores. Achaenia oblonge linearia, obcompressa, atra, exalata, marginibus

et facie interiore subsparsim erecto-setosa, facie exteriore obscure circ. 16-sulculata, corpore circ. 4 mm. longa et circ. 0.6–0.7 mm. lata; pappo minuto, poculiformi setoso-ciliatoque duabus setis oppositis manifestioribus tenuibus antrorsum hispidulis sub 0.7 mm. longis ex angulis ortis.

Type specimen: Collected by *Captains Speke* and *Grant*, No. 448, at altitude of 1,200–1,500 meters, Karagwe (Karagué) region, German East Africa, March, 1862 (Kew).

Distribution: Region of Karagwe, German East Africa.[1]

Specimens examined: *Speke & Grant* 448 (type, Kew).

Oliver (loc. cit.) described this species as an annual, but Skan, who had had an opportunity of studying var. *β. Stapfii* (qu. vide) in cultivation, described the species (in which he included var. *Stapfii*) as a perennial. The type specimen lacks the basal part, thus offering no aid in settling the matter. It may be noted, however, that herbarium specimens of vars. *Dawei* and *Scaettae* have definitely annual roots.

Bidens Grantii var. *β.* **Stapfii** Sherff, Bull. Jard. Bot. Brux. 13: 287. 1935. Pl. CXXXVII, figs. *a–i*.

Coreopsis Grantii Skan (non Oliv.) in Curtis's Mag. *pl. 8110*. 1906.

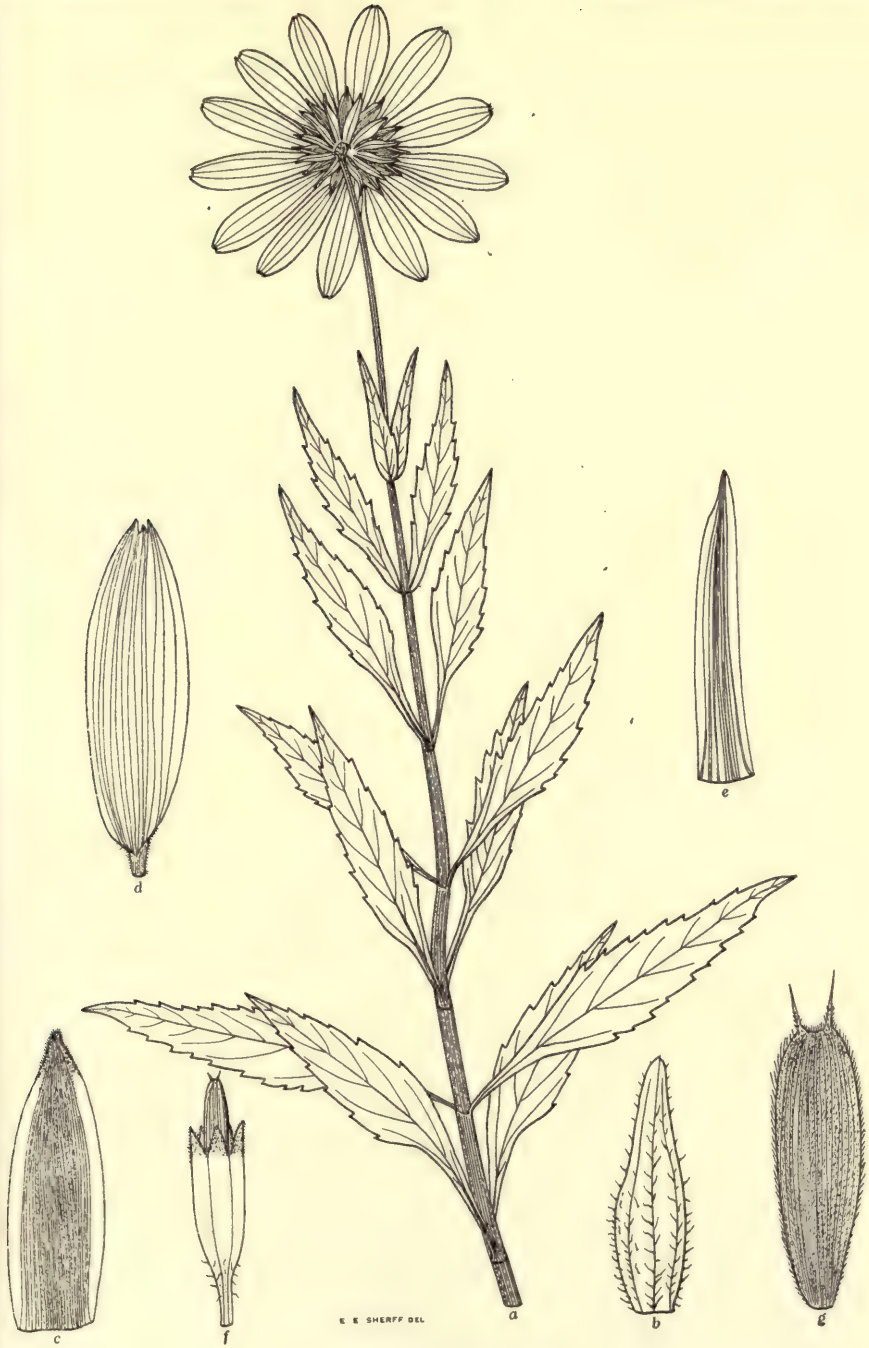
Perennis suffruticosaque, ramis patentissimis. Folia longe tenuiterque petiolata petiolis usque ad 4 cm. longis, petiolo (ut rhachi anguste alato et supra canaliculato) adjecto principalia 1–1.7 dm. longa et basi usque ad 1.5 dm. lata, atroviridia, paulum viscida, 2–3-pinnatifida; lobulis membranaceis, ovatis, apice rotundatis (terminalibus angustioribus acutis exceptis), minutissime apiculatis. Capitula paulo magis tenuiter longeque pedunculata. Achaenia paulo setosiora (setosa etiam facie exteriore), corpore 6.5–8 mm. longa et 1–1.5 mm. lata; aristis 1–1.3 mm. longis.

Type specimen: Collected by *Ernest Brown*, No. 137, at altitude of 1,230 meters, District of Buddu, Uganda Protectorate, British East Africa, December, 1904 (Kew).

Distribution: Known only from type locality in Uganda, British East Africa.

Specimens examined: *Brown* 137 (type, Kew); *Hort. Kew.*, cult., February, 1906 (e seminibus a M. T. Dawe cum E. Brown in Buddu, 1905, lectis; Kew, 2 sheets; the basis of *pl. 8110* in Curtis's Bot. Mag.).

[1] Many Congo specimens cited by Belgian workers as *B. Grantii* prove to be *Coreopsis oligoflora* Klatt or a variety of that species.



BIDENS SOMALIENSIS Sherff

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The late Dr. Otto Stapf had studied the type and had noted on the sheet, "a *C. Grantii* non differt nisi acheniis."

Bidens Grantii var. γ. **Dawei** Sherff, Bull. Jard. Bot. Brux. 13: 288. 1935.

Folia breviter lateque petiolata petiolis plerumque 4–10 mm. longis, petiolo adjecto 4–6 cm. longa 2–3-pinnatifida lobis lanceolatis vel oblonge linearibus. Capitula circ. 4 (rarius 5) cm. lata. Achaenia corpore 5–8 mm. longa, aristis usque ad 1.6 mm. longa.

Type specimen: Collected by *M. T. Dawe*, No. 243, at altitude of 1,170 meters, District of Buddu, Uganda Protectorate, British East Africa, in 1905 (Kew).

Distribution: Westernmost British and German East Africa and adjacent Belgian Congo.

Specimens examined: *Joseph Bequaert* 5987, Belgian Congo, 1919 (Bruss., 2 sheets); *Dawe* 243 (type, Kew); *Speke & Grant* 406, corn fields, Karagwe (Karagué), German East Africa, 1861 (Kew).

Bidens Grantii var. δ. **Scaettae** Sherff, Bot. Gaz. 96: 146. 1934.

Gracilis, ± 5 dm. alta, caule subsimplici glabrato vel supra sparsim piloso internodiis principalibus quam foliis multo longioribus. Folia bi–tripinnatisecta, supra moderate infra densissime hispida, lobis lineari-oblongis ultimis acerrime apiculatis terminali 1.5–2 cm. longo et circ. 2–3 mm. lato. Achaenia corpore circ. 4 mm. longa et sub 1 mm. lata, aristis circ. 1.5 mm. longis.

Type specimen: Collected by *H. Scaetta*, No. 2286, Nyabihu, Ruanda District, northwesternmost German East Africa, 1930 (Bruss.).

Distribution: Ruanda District, northwesternmost German East Africa.

Specimens examined: *Muller* 46, Kitega, Ruanda, 1933 (Bruss.); *Scaetta* 2286 (type, Bruss.); *idem* 2294, on clay soil in field unused for 10 years, dry country, Nyabihu, Ruanda, 1930 (Bruss.).

EXPLANATION OF PLATE CXXXVII, FIGS. *a–i*

Bidens Grantii var. *Stapfii: a*, flowering and fruiting specimen, ×0.57; *b*, cauline leaf, ×0.57; *c*, portion of leaf enlarged to show pubescence, ×3.4; *d*, exterior involucral bract, ×2.27; *e*, interior involucral bract, ×2.27; *f*, ray corolla, ×1.7; *g*, palea, ×2.27; *h*, disc floret, ×3.4; *i*, achene, ×3.4; all from *Brown* 137, in Hb. Kew.

162. **Bidens Uhligii** Sherff, Bull. Jard. Bot. Brux. 13: 286. 1935.

Herba erecta, verisimiliter perennis atque ±8 dm. alta, ramosa; caule ramisque tenuibus glabratisque, plus minusve angulatis. Folia petiolata petiolis planis tenuibus supra glabratis sed ad marginem hispidis usque ad 4 cm. longis, petiolo adjecto usque ad 1 dm. longa, membranaceissima, principalia 2–3-pinnatisecta, rhachi tenui vix nisi supra medium alata; foliolis (segmentis primariis) 3 vel 5, circumambitu ovatis vel ovato-lanceolatis, segmentis ultimis acutis, duabus faciebus adpresso-hispidis, ciliatis. Capitula ad ramorum apices subcorymboide disposita, tenuiter vel tenuissime pedicellata pedicellis usque ad 9 cm. longis, radiata, pansa ad anthesin circ. 4 cm. lata et circ. 7–9 mm. alta. Involucrum hispidum; bracteis exterioribus 8–10, oblongo-linearibus, tergo mediane 1-nerviis, apice acutis vel obtusis, circ. 5–9 mm. longis; interioribus oblongis, vix longioribus. Flores ligulati ± 8, ligula elliptico-oblongi, flavi, apice subintegri, circ. 2.5 cm. longi. Paleae oblonge lineares, glabrae, usque ad ±1 cm. longae. Ovaria anguste linearia, infra sensim angustata, exalata, faciebus multistriata et sparsissime vel etiam numerose erecto-hispida, erecto-ciliata setis e tuberculo minuto saepius ortis, corpore 5–6 mm. longa et sub 0.8 mm. lata, apice atriore dense erecto-hispida et biaristata aristis tenuibus antrorsum subsparsimque hispidulis ±1.5 mm. longis.

Type specimen: Collected by *Carl Uhlig*, No. V.46, near edge of forest, Ukerewe, Lake Victoria Nyanza, German East Africa, April 21, 1904 (Berl.).

Distribution: Known only from type locality in German East Africa.

Specimens examined: *Uhlig* V.46 (type, Berl.).

163. **Bidens Steppia** (Steetz) Sherff, Bot. Gaz. 76: 82. 1923. Pl. CXXXVII, figs. *j–r*.

Coreopsis Steppia Steetz, Nat. Reise nach Mossambique 496. 1862–1864.

a. Achaenia biaristata.

b. Achaeniorum corpora 5.5–9 mm. longa et 1.1–2.6 mm. lata. *B. Steppia* sensu stricto.

b. Achaeniorum corpora 7–10.5 mm. longa et 1.1–1.3 mm. lata; involucri bracteis exterioribus circ. 9–14 mm. longis. var. *β. leptocarpa*.

b. Achaeniorum corpora 4–7.5 mm. longa et 1.1–1.3 mm. lata; involucri bracteis exterioribus 4–6 mm. longis. . . . var. γ. *Elskensii.*

a. Achaenia exaristata vel breviter bidentata. . . . var. δ. *ambacensis.*

Herba annua, erecta, 6–10 dm. alta; caule teretiusculo vel subtetragono, glabrato vel hinc inde pilis elongatis consperso. Folia breviter petiolata petiolis latis hispido-ciliatis et 0.5–6 cm. longis, petiolo adjecto 4–25 cm. longa, principalia ternata vel inciso-bi–tripinnatifida; foliolis (praesertim terminali) elongatis, lanceolatis vel late linearibus, inciso-dentatis vel terminali saepe integro, membranaceis, ciliatis, utrinque sparsim pilosis. Capitula pauca, tenuiter pedunculata pedunculis 3–12 cm. longis, radiata, pansa ad anthesin 3.5–5.5 cm. lata et 1.2–1.4 cm. alta. Involucri bracteae exteriores 8–16, elongatae, lineares, ciliatae, infra pilis articulatis hirsutissimae, 0.7–2 cm. longae; interiores oblongae vel late lanceolatae, dorso pilis articulatis plus minusve hirsutae, 8–10 mm. longae. Flores ligulati saepius 11 vel 12, flavi, ligula anguste elliptici, 9–13 striis percursi, apice saepe dentati, 2–2.5 cm. longi. Achaenia linearioblonga, nigra, obcompressa, exalata, (saepe margine crasso) dense et adrecte ciliata, faciebus adpresse plus minusve setosa praesertim supra, corpore 5.5–9 mm. longa et 1.1–2.9 mm. lata, apice setosa ac biaristata; aristis tenuibus, erectis, antrorsum hispidulis, 1.5–4.5 mm. longis.

Type specimen: Collected by *Wilhelm Peters*, No. 57, in various spots near damp places, Rios de Sena, Mozambique, State of East Africa, 1842–1848 (Berl., 2 sheets).

Distribution: Widely scattered across Africa from Angola (in Portuguese West Africa) eastward and northeastward to Mozambique, to German East Africa, and to western British East Africa.

Specimens examined: *George Adamson* 363, alt. 1,800–2,100 meters, Mt. Mlanje, Nyassaland, British Central African Protectorate, March, 1897 (Brit.; Kew); *Antunes* 197, Huilla, Angola (Berl.); *John Buchanan* 190, alt. 2,100 meters, Blantyre, Nyassaland, British Central African Protectorate (Kew); *idem* 251, Nyassaland, 1891 (Berl., 2 sheets; Brit.; U.S.); *idem* 928, eodem loco et tempore (Gray; U.S.); *K. J. Cameron* 38, Namasi, communic. December 19, 1899 (Kew); *Corbisier* 172, Belgian Congo, November 8, 1919 (Bruss., 2 sheets); *M. T. Dawe* 393, Melange (Malanji) Plateau, Angola, April 18, 1922 (Kew); *Fred Eyles* 307, granite hills, alt. 1,320 meters, Distr. Mazoe, Southern Rhodesia, April, 1906 (Brit.); *Miss A. E. Gairdner* 414, Livingstone Distr., Rhodesia, March (Kew); *John Gossweiler* 1201, common in good cultivated ground or on sugar cane

plantations about Malange (Malanji), Angola, May 26, 1903 (Brit.; Kew, 2 sheets); idem 3831, in woods and open places, not common, near village of Katoco-Kubango, Angola, May 7, 1906 (Brit.; Kew); *idem* 5726, in herb-grown thickets, along road between Camondai and Grunja de S. Suiz Cazengo and at Saco Matari, Angola, May 20, 1912 (Brit.); *W. P. Johnson* 354, Tumbi Hill, April 27 (Kew); *T. Kassner* 2658, mountain slopes, Musofi River, Belgian Congo, May 1, 1908 (Berl.); *idem* 3182, open places, Ruzizi Valley, Belgian Congo, July 23, 1908 (Kew); *Miss E. Kenyon* 55 (Kew); *J. Kirk*, alt. 900 meters, Mbame, Manganja (Maganja) Hills, Zambesiland, July, 1861 (Kew, 2 sheets); *Mrs. Macaulay* 633 p.p., near Mumbwa, Northern Rhodesia, 1911 (Kew); *C. J. Meller*, vicinity of Blantyre, Nyassaland, August–September, 1861 (Kew); *Peters* 57 (type, Berl., 2 sheets); *Stuhlmann* 2120, alt. 1,500 meters, Ruhanga, Uganda, British East Africa, April 20, 1891 (Berl.); *Welwitsch* 3531, alt. 1,140–1,650 meters, in bushy meadows at Lake Ivantala, Distr. Huilla, Angola, February, 1860 (Brit.; Kew; Par.); *idem* 3532, alt. 300–720 meters, Distr. Golungo Alto, Angola (Berl.; Brit.; Kew).

As already stated (Sherff, loc. cit.), the two type specimens are extant in fairly good condition. Their several mature achenes are seen on close inspection to be devoid of true wings (cf. Peters, loc. cit., "achaeniis oblongis subcompressis marginatis sed vix alatis"), and to have merely rough, thickened margins, similar to those on certain species of true *Bidens*, e.g., *B. aristosa* (Michx.) Britt. In a previous paper (Bot. Gaz. 59: 305–308. 1915) I have stated the reasons for regarding such plants as belonging to *Bidens*.

Coreopsis Mattfeldii Sherff (Bot. Gaz. 76: 83. 1923) bears a strong superficial resemblance to *Bidens Steppia*, but can easily be distinguished by its achenes and involucral bracts. The many mature achenes on the type of *C. Mattfeldii* differ remarkably from the ones on the type and other specimens (already cited) of *B. Steppia*. For *B. Steppia* they are (at most) widely oblong-linear in outline, 7.5–9 mm. long and 2.5–3 mm. wide; there is merely a thickened lateral ridge, wings being absent. For *C. Mattfeldii* the achenes are much thinner and wider, the outer obovate, 6–8 mm. long and 4.25–5 mm. wide, the inner oblanceolate, about 8 mm. long and 4 mm. wide; all are winged, and even on submature fruiting heads the rounded upper ends of the wings, adjacent to the aristae, are easily visible. The external bracts about equal the inner ones in *C. Mattfeldii;* in *B. Steppia* they tend to exceed the inner ones by at least 2–6 mm.

Coreopsis oligoflora Klatt is another species of *Coreopsis* closely similar in superficial aspect to *B. Steppia.*

Bidens Steppia var. β. **leptocarpa** Sherff, Bot. Gaz. 90: 392. 1930.

Herba 1–1.5 m. alta. Capitula pansa ad anthesin 5–6.5 cm. lata; bracteis exterioribus 8–10, circ. 9–14 mm. longis et 1.2–2 mm. latis, quam interioribus oblongo-ovatis paulo longioribus. Flores ligulati plerumque 8, circ. 2.5–3 cm. longi. Achaenia anguste oblongo-linearia, plana, nigra, unaquaque facierum circ. 8-sulculata, marginibus apiceque erecto-ciliata, faciebus praecipue supra plus minusve erecto-setosa, exalata, corpore 7–10.5 mm. longa et 1.1–1.3 mm. lata, biaristata aristis erectis stramineis tenuibus antrorsum hispidis circ. 2 mm. longis.

Type specimen: Collected by *Ad. Stolz,* No. 729, growing 1.5 meters high at altitude of 1,350 meters, Kaningwe, Langenburg, German East Africa, May 26, 1911 (Berl.).

Distribution: German East Africa, also Angola.

Specimens examined: *Braun* 5505, growing 1 meter high, Niamutukusja Nsira, Distr. Bukoba, German East Africa, June 15, 1913 (Berl.); *O. Elskens* 20, on sandy plain of Lake Tanganyika, Rumonge, Urundi, German East Africa, May 23, 1922 (Bruss.); *John Gossweiler* 8477, alt. 1,200 meters, Angola, September 30, 1922 (Berl.); *Stolz* 729 (Berl., type: cotypes, Del., 2 sheets; Kew); *F. L. Stuhlmann* (*Exped. Emin Pascha*) 4156, Nuansa, May 20, 1892 (Berl.).

Bidens Steppia var. γ. **Elskensii** Sherff, Bull. Jard. Bot. Brux. 13: 286. 1935.

Capitula pansa ad anthesin parce 3 cm. lata. Involucri bracteae exteriores 7–10, tantum 4–6 mm. longae, quam interiores breviores. Achaenia corpore 4–7.5 mm. longa et 1.1–1.3 mm. lata, biaristata aristis 3–4 mm. longis.

Type specimen: Collected by *O. Elskens,* No. 257, in places long cultivated, hills at Kitega, Ruanda, northwesternmost German East Africa, December 13, 1922 (Bruss.).

Distribution: Ruanda, German East Africa.

Specimens examined: *Elskens* 257 (type, Bruss.).

Plant said by Elskens to grow about 1.6 meters tall, to be eaten by cattle, and to have the native name "chikuchike." The flowers are described as odorless. The fruiting heads approach, in their small size, those of *B. kivuensis,* but the general foliage habit and habit of flowering heads are more as in *B. Steppia.*

Bidens Steppia var. δ. **ambacensis** (Hiern) Sherff, Bot. Gaz. 90: 392. 1930.

Coreopsis ambacensis Hiern, Cat. Welw. Afr. Pl. 3: 586. 1898.
Bidens ambacensis (Hiern) Sherff, op. cit. 59: 309. 1915.

A specie achaeniis tantum 5–7 mm. longis et 0.8–0.9 mm. latis, exaristatis sed breviter bidentatis differt.

Type specimen: Collected by *Friedrich Welwitsch*, No. 3272 pro parte, in marshy places on the left bank of the Caringa River, Ambaca, Angola, Portuguese West Africa, June, 1855 (Brit.).

Distribution: Known only from Angola.

Specimens examined: *John Gossweiler* 8936, alt. 1,300 meters, vicinity of River Gola Luije, Malange, June, 1925 (Kew); *Welwitsch* 3272 pro parte (type, Brit.).

The type has the general habit of *B. Steppia* proper but differs in the small, slender achenes. The existence of the var. *leptocarpa*, as also of several transitional forms between *B. Steppia* proper and var. *leptocarpa*, shows, in my opinion, that the achenial distinctions for the *ambacensis* type are varietal rather than specific.

EXPLANATION OF PLATE CXXXVII, FIGS. *j–r*

Bidens Steppia: j, flowering and fruiting specimen, ×0.57; *k*, portion of cauline leaf, ×0.57; *l*, exterior involucral bract, ×1.7; *m*, interior involucral bract, ×1.7; *n*, ray corolla, ×1.7; *o*, palea, ×1.7; *p*, disc floret, ×1.7; *q*, achene, ×3.4; *r*, portion of achene, ×7.94; *j*, *l–q*, mainly from *Cameron* 38, in Hb. Kew, but slightly from *Dr. J. Kirk*, alt. 900 meters, Mbame, Manganja Hills, Zambesiland, July, 1861, in Hb. Kew; *k*, *r*, from type.

164. **Bidens rufovenosa** Sherff, Bot. Gaz. 59: 301. 1915. Pl. CXXXVIII, figs. *a–i*.

Herba erecta, perennis, 4–6 dm. alta; caule subtereti, striato, glabro, plus minusve ramoso; ramis (vel ramulis) monocephalis. Folia principalia petiolata petiolis angustis usque ad 1.5 cm. longis, petiolo adjecto 4–6 cm. longa, pinnata, spinuloso-ciliata, supra sparsim et brevissime spinuloso-pubescentia, infra sparsim pubescentia et ad venas interdum rufo-tomentosa; foliolis lateralibus lanceolatis vel foliorum superiorum lineari-lanceolatis, incisis vel longe dentatis. Folia summa indivisa lanceolataque vel ternata foliolis integris lanceolatisque. Capitula radiata, pansa ad anthesin 3.5–4.5 cm. lata et 8–12 mm. alta, in fructu 1–1.3 cm. lata et 0.8–1 cm. alta. Involucri bracteae membranaceae, margine plus minusve diaphanae, duplici serie dispositae; exteriores 7 vel 8, lineares,

3–6 mm. longae; interiores lanceolatae, dimidio longiores. Flores ligulati 7–9, aurantiaci, ligula anguste lanceolati, apice integri, ad basim minute hispidi, 7–9-lineati, 1.5–1.8 cm. longi. Paleae lineares, 6–8 mm. longae. Achaenia linearia atro-brunnea, subplana, una facie valde unicostata, margine faciebusque dense sed breviter erecto-hispida (praecipue supra), corpore circ. 8–9 mm. longa, biaristata aristis nudis, usque ad 1 mm. longis.

Type specimen: Collected by *John Gossweiler*, No. 4176, among the ferruginous rocks near the fort at Kabango, Principality of Amelia, Angola, Portuguese West Africa, December, 1907 (Brit.).

Distribution: From eastern Southern Rhodesia to Angola.

Specimens examined: Ex *Dept. Agriculture*, No. 2482, Salisbury, Southern Rhodesia (Kew); *Mrs. O. Craster* 211, eodem loco, communic. May 27, 1914 (Kew); *Gossweiler* 4176 (type, Brit.).

At the time of writing the original description of *Bidens rufovenosa*, there were at hand only my large photograph of the type and a small fragment which had been lent me. The one leaf on this fragment had the pubescence along the veins of the lower leaf-surfaces conspicuously red-tomentose. The habitat cited by Gossweiler, "amongst ferruginous rocks," led at once to the thought that iron in some form had been taken from the soil into the roots, then carried through the stem and leaves to the lower leaf surfaces and deposited there, doubtless as an oxide of iron. This view having been rejected by an eminent plant physiologist to whom it had been stated, the leaf was given for study to Dr. Sophia H. Eckerson, then of the University of Chicago. She reported the color of the pubescence as due to a red stain produced in the mucilage cells along the veins. Apparently, then, the stain afforded a character of diagnostic value.

More recently I have reexamined the type. Only certain leaves possessed the rufo-tomentose character. Furthermore, the thickish root was covered with a deposit, of the reddish color noted in the hairs on some of the lower leaf-surfaces, but other material examined lacks the red. Clearly the rufo-tomentose character is here a fickle one, doubtless being entirely dependent upon the "ferruginous" nature of the rocks or soil in the habitat.

EXPLANATION OF PLATE CXXXVIII, FIGS. *a–i*

Bidens rufovenosa: a, flowering and fruiting specimen, ×0.61; *b*, lower leaf and portion of adjacent stem, ×0.61; *c*, portion of leaflet, enlarged to show hairs, ×6.12; *d*, exterior involucral bract, ×3.67;

e, interior involucral bract, ×3.67; *f*, ray floret, ×1.83; *g*, palea, ×3.67; *h*, corolla of disc floret, ×3.67; *i*, achene, ×3.67; all from type.

165. **Bidens asperata** (Hutch. & Dalz.) Sherff, Bot. Gaz. 93: 220. 1932. Pl. CXXXIX.

Coreopsis asperata Hutch. & Dalz. Fl. West Trop. Afr. 2: 141–143. 1931; Sherff, op. cit. 219.

Herba perennis, verisimiliter 1–2 m. alta, erecta, ramosa, caule ramisque subtetragonis, glabris. Folia inferiora non visa, superiora breviter petiolata petiolis planis latissimis basi connatis ± 1 cm. longis, petiolo adjecto 6–11 cm. longa, pallida, membranacea, faciebus glaberrima, pinnatim 3–5-partita; foliolis lanceolatis acriter dentatis vel subincisis, ciliatis, usque ad circ. 2 cm. latis. Capitula pauca, corymbosa, subvalide pedunculata pedunculis superne pubescentibus circ. 4–8 cm. longis, demum circ. 2.5–3 cm. lata et 1.5–1.8 cm. alta; radio non viso. Involucri basaliter pubescentis bracteae exteriores circ. 7 vel 8, ovatae vel late lanceolatae, superne angustatae, apice obtusae, margine glabratae vel plus minusve ciliatae, tergo circ. 5–7-nerviae, 1.2–1.6 cm. longae et 3–6 mm. latae; inferiores rigidae, oblongo-obovatae, tergo plus minusve hispidae, apice angustatae ac pubescentes, paulo breviores. Paleae lineares, apicaliter coloratae, achaeniorum aristas aequantes vel parce superantes. Achaenia plana, brunneo-atra, late vel moderate oblonga, utraque facie circ. 16-sulcata, costis marginibusque creberrime papillata papillis setis munitis, corpore 7–8 mm. longa et 2–2.8 mm. lata, apice valde erecto-setosa et biaristata; aristis subdivergentibus, rectis, apicem versus nudis inferne 1–3 hamis antrorsum hamosis, 1.5–2 mm. longis.

Type specimen: Collected by *Aug. Chevalier*, No. 20554, Cercle de Faranah (Faranna, Farana), "entre Sambadougou," French Guinea, January 27, 1909 (Kew).

Distribution: French Guinea and Sierra Leone, southeastward to the upper Sassandra River, Ivory Coast.

Specimens examined: *Chevalier* 20554 (type, Kew).

EXPLANATION OF PLATE CXXXIX

Bidens asperata: a, *b*, portions of fruiting branch, ×0.62; *c*, exterior involucral bract, ×3.08; *d*, interior involucral bract, ×3.08; *e*, palea, ×3.08; *f*, disc floret, ×4.93; *g*, achene, ×4.93; all from type.

166. **Bidens rubra** DeWild. Repert. Sp. Nov. 13: 203. 1914. Pl. CXL, figs. *h–o*.

Herba annua, erecta, verisimiliter 4–8 dm. alta, ramosa, caule (saepe acerrime) ramisque quadrangularibus, piloso-scabris (non

BIDENS SERETII (DeWild.) Sherff

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"velutinis"), ramulis subglabris. Folia petiolata petiolis pilosis plerumque usque ad 1.5 cm. longis, petiolo adjecto 4–8 cm. longa, pinnatisecta; foliolis 3–7, linearibus, acriter calloso-apiculatis, sparse pilosulis, 0.5–2 mm. latis et usque ad 5.5 cm. longis. Capitula solitaria, ramos terminantia, pedunculata pedunculis 1.5–3.5 cm. (supra bracteas lineares) longis, radiata, pansa ad anthesin 2.5–4 cm. lata et 7–11 mm. alta. Involucri bracteae extimae circ. 6–8, lineares (non "lanceolatae"), acriter calloso-apiculatae, dorso plus minusve dense hispidae, demum 5–7.5 mm. longae; medianae ovato-ellipticae, breviter apiculatae, dorso sparse hispidae, usque ad 7 mm. longae et 4 mm. latae; intimae glabrae, usque ad 1 cm. longae. Flores ligulati 4–6 (plerumque 5), glabri, rubri vel exsiccati violacei, plerumque 5–7-nervati, ligula elliptici, usque ad 17 mm. longi et circ. 4–4.5 mm. lati; tubulosi flavidi, infra angusti, supra inflato-urceolati, glabri, circ. 3 mm. longi (antheris exsertis non inclusis). Achaenia valde obcompressa, margine apiceque setuloso-ciliata, faciebus glabra sed manifeste minuteque circ. 8-striata; exteriora lineari-oblonga, atro-brunnea, interdum exaristata, circ. 5–7 mm. longa et 1–1.4 mm. lata; interiora linearia, non elongata, atra, corpore usque ad 1 cm. longa et 1 mm. lata, biaristata aristis retrorsum hamosis circ. 1.5–2 mm. longis.

Type specimen: Collected by *Joseph Bequaert*, No. 389, at Welgelegen, Katanga, Belgian Congo, May 2, 1912 (Bruss.).

Distribution: Known only from southeasternmost portion of Belgian Congo.

Specimens examined: *Bequaert* 389 (type, Bruss.); *idem* 563, Welgelegen, Katanga, May 2, 1912 (Bruss.); *Homblé* 563, eodem loco et tempore (Bruss.); *T. Kassner* 2859*a*, open grass plain, Lukifwa River, May 24, 1908 (Berl.; Brit.; forma involucri bracteis exterioribus interiores aequantibus).

In the herbarium at Brussels are two sheets labeled *J. Bequaert* 389. One bears a specimen having fairly large flowering heads (2.5–4 cm. wide) with red or violaceous ligules and moderately thick, not elongated achenes. This sheet bears Bequaert's original field label and clearly is the one kept mainly in mind by De Wildeman when he named and described *Bidens rubra*. It is, moreover, the main basis of my description. The other sheet bears a very different plant with small (7–8 mm. wide), discoid flowering heads and slender, elongated achenes. This second specimen matches the type of *Bidens ciliata* De Wild. (=*B. paupercula* Sherff), i.e., *Bequaert* 302, and doubtless was really a duplicate of the *B. ciliata* type, but through some error in mounting was given the wrong number. It

was unfortunately confused by De Wildeman with his *B. rubra*, as is shown by his erroneously describing the achenes of *B. rubra* as elongate, up to about 15 mm. long.

EXPLANATION OF PLATE CXL, FIGS. *h–o*

Bidens rubra: h, flowering and fruiting specimen, ×0.63; *i*, portion of stem, ×3.15; *j*, exterior involucral bract, ×3.15; *k*, interior involucral bract, ×3.15; *l*, ray floret, ×3.15; *m*, palea, ×3.15; *n*, disc floret, ×3.15; *o*, achene, ×3.15; all from type.

167. **Bidens urceolata** De Wild. Ann. Mus. Congo IV. 167. 1903. Pl. CXL, figs. *a–g*.

Herba annua, erecta, glabra vel ad nodos parce pilosa, caule ramisque perspicue angulata, ±7 dm. alta. Folia petiolata petiolis basi connatis et usque ad 2.5 cm. longis, petiolo adjecto 4–8 cm. longa, pinnatim 3–5-partita; foliolis linearibus 1–3 mm. latis, membranaceis vel subcarnosis, non perspicue ciliatis, apice acutis, lateralibus non divaricatis et rariter lobatis. Capitula tenuiter pedunculata pedunculis 3–9.5 cm. longis, radiata, pansa ad anthesin 3.5–5 cm. lata et 8–12 mm. alta. Involucrum inferne hispidum; bracteis exterioribus 7–14, linearibus, ciliatis, acriter calloso-apiculatis, 6–8 (rariter –10) mm. longis; interioribus brevioribus, ovato-lanceolatis, supra conspicue scarioso-marginatis. Flores ligulati 5–8, violacei vel sicci plus minusve flavi, ligula elliptico-oblanceolati, apice integri vel denticulati, 1.5–2.5 cm. longi. Flores tubulosi superne interdum perspicue urceolati, 1.5–3 mm. lati, nunc violacei, nunc flavidi sed venis et loborum marginibus brunnei, tubo quam ovariorum aristae longiores. Achaenia lineari-oblonga, atro-brunnea, apicem versus plana, alibi obcompressa, faciebus marginibusque perspicuissime brunneo-tuberculata, suberecto-ciliata, corpore 9–14 mm. longa et 1.2–1.7 mm. lata, biaristata aristis retrorsum hamosis 1–2.3 mm. longis.

Type specimen: Collected by *E. Verdick*, No. 464, at Lukafu, Katanga, Belgian Congo, April, 1900 (Bruss.).

Distribution: Southeastern Belgian Congo and probably also adjacent portion of Rhodesia.

Specimens examined: *Alex Carson* 34, Tanganyika-Moero Plateau, Central Africa, 1894 (Kew); *T. Kassner* 2725, slope of Mt. Kundelungu, Belgian Congo, May 7, 1908 (Berl.); *Verdick* 464 (type, Bruss.).

Fortunately, the mature specimen by Carson has been available for the description of the achenes, those on the type being immature.

EXPLANATION OF PLATE CXL, FIGS. *a–g*

Bidens urceolata: a, flowering branch, ×0.63; *b*, exterior involucral bract, ×3.15; *c*, interior involucral bract, ×3.15; *d*, ray corolla, ×1.26; *e*, palea, ×3.15; *f*, disc floret, ×3.15; *g*, upper portion of achene, ×3.15; all from type, except lowermost pair of leaves in *a* taken from the identical *Kassner* 2710, in Hb. Berl.

168. **Bidens leptolepis** Sherff, Bot. Gaz. 76: 85, *pl. 9, figs. a–g.* 1923; ibid. 85: 12. 1928. Pl. CXXXVIII, figs. *j–p.*

Herba annua, erecta, glabra vel fere glabra, ramosa, caule tetragona, circ. 4–6 dm. alta. Folia tenuiter petiolata petiolis 1–3.5 cm. longis, petiolo adjecto usque ad 1.1 dm. longa, pinnatim 3–5 (rariter –7) -partita; foliolis membranaceis, lateralibus plus minusve prorsum spectantibus; omnibus nunc elongato-linearibus et 1–2 mm. latis, vel nunc rursus plus minusve partitis segmentis oblongo-linearibus usque ad 5 mm. latis, ultimis lobis apicem versus rotundatis, apice ipso mucronulatis, margine obsolete vel debiliter ciliatis et saepe involutis vel revolutis. Capitula ramos terminantia, pedunculata pedunculis 2–7 vel rarius –15 cm. (supra summum jugum foliorum verorum) longis, radiata, pansa ad anthesin 2.2–3 cm. lata et 0.7–1.1 cm. alta. Involucri bracteae (saepe perspicue) dimorphae, exteriores numerosae (11–18), patentes vel recurvatae, (saepe angustissime) lineari-elongatae, hispidae vel apicem versus glabratae, apice indurato acutae, basi moderate dilatatae, 6–9 mm. longae, interiores ovato-lanceolatae, exterioribus subaequales. Flores ligulati 6–8, ligula oblanceolati vel anguste obovati, valde et perspicue atropurpurei vel atro-rubri, apice rotundato plus minusve emarginati et saepe 1–5 dentibus minutis denticulati, 0.9–1.5 cm. longi. Achaenia linearia, exalata, infra sensim supra saepe subabrupte angustata, atra, obcompressa, utraque facie circ. 8-sulcata, faciebus marginibusque saepe minute erecto-setosa, corpore 9–14 mm. longa et 1–1.3 mm. lata, quam paleae anguste lineares paulo breviora, apice biaristata aristis retrorsum hamosis, circ. 1.7–2 mm. longis.

Type specimen: Collected by *T. Kassner*, No. 2725, under trees, Mt. Kundelungu, Belgian Congo, May 10, 1908 (Berl.).

Distribution: Belgian Congo.

Specimens examined: *Kassner* 2725 (type, Berl.); *F. G. Overlaet*, Kafakumba, April, 1925 (Berl.; Field, 3 sheets; Kew).

Appears closest in foliage and general habit to *B. urceolata* De Wild., a species also collected by *Kassner* (No. 2710) on Mt.

Kundelungu.[1] *B. leptolepis* has smaller flowering heads, very dark red or dark purple, not light violet ligules, much more slender and elongate external involucral bracts, ordinary (not conspicuously margined above) internal involucral bracts, and lacks a definitely urceolate shape to the tubular florets.

It was described originally from the single type specimen by Kassner. Shortly afterward I was able to enlist the friendly cooperation of Mr. F. G. Overlaet of Belgium. In April, 1925, Mr. Overlaet's official duties had taken him to Kafakumba, Belgian Congo, where he collected several handsome specimens of this *Bidens*. These, together with various other Congo specimens found by him, were forwarded to me and are now deposited in the herbaria cited. They afford a much broader and more representative notion of the species than was possible from the lone type specimen. The achenes are mature, the leaves are mostly more divided, with shorter and broader segments, and the external involucral bracts are often more numerous than in the type and also often shorter and less noticeably narrowed. The rays of the two dozen or more flowering heads examined vary from dark red to densely dark purplish-red, as in the type. With the aid of these additional specimens the above amplified description has been drawn.

EXPLANATION OF PLATE CXXXVIII, FIGS. *j–p*

Bidens leptolepis: j, flowering branch, ×0.61; *k*, exterior involucral bract, ×2.44; *l*, interior involucral bract, ×2.44; *m*, ray floret, ×2.44; *n*, palea, ×2.44; *o*, disc floret, ×2.44; *p*, ovary, ×7.32; all from type.

169. **Bidens taitensis** Sherff, Bot. Gaz. 90: 396. 1930. Pl. CXLI.

Herba erecta, verisimiliter perennis, glabra vel sparsissime hispida, forsitan 1 m. alta. Folia principalia petiolata petiolis marginatis ± 1.5 cm. longis, petiolo adjecto ± 9 cm. longa, circumambitu late deltoideo-ovata, bipinnatisecta; foliolis (lateralibus 2 jugis) membranaceis, subgrosse dentatis, decurrentibus, saepius oblongo-lanceolatis vel ovato-lanceolatis, minute nigro-punctatis, segmentis apicaliter subacutis. Capitula tenuiter pedunculata pedunculis glabratis vel ad summam hispidis, ± 1 dm. longis, radiata, pansa ad anthesin probabiliter 3–5 cm. lata et 8–10 mm. alta. Involucri bracteae exteriores circ. 8 vel 9, late oblongae, apice obtusae cartilagineo-indurataeque, marginibus eciliatae, tergo nonnullis lineis

[1] The type of *B. urceolata* came from Lukufu, in the same region.

BIDENS STUHLMANNII (O. Hoffm.) Sherff

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nervatae, circ. 8–9 mm. longae et 2–4 mm. latae; interiores late oblongo-lanceolatae dorsaliter subsparsim hispidae, apicaliter dense pubescentes, saepe paulo breviores. Flores ligulati (tantum unicus visus) flavi, ligula lineari-oblongi, nervis pilosi, apice subintegri, ± 1.5 cm. longi. Achaenia nunc late cuneato-linearia nunc oblongo-oblanceolata, plana, atra, utraque facie circ. 8-striata, non vere alata, marginibus dense faciebus non nisi supra erecto-setosa, corpore 6–8 mm. longa et 1.5–2.2 mm. lata, apice erecte hispido et concavo vel raro plano exaristata vel brevissime biaristata aristis usque ad 0.5 mm. longis nunc calvis nunc antrorsum 1–3-hamosis.

Type specimen: Collected by *J. M. Hildebrandt*, No. 2432*a*, at altitude of 600–900 meters, Taita (Teita) Mountains, British East Africa, February, 1877 (Berl.).

Distribution: Known only from type locality in British East Africa.

Specimens examined: *Hildebrandt* 2432*a* (type, Berl.).

Hildebrandt's No. 2432 was collected in quantity and proved to be new (*Bidens Hildebrandtii*). Specimens were distributed to several herbaria. His 2432*a*, though collected at the same time and place, seems to have been rare, for apparently only a single specimen was found, and that none too ample. The habit seems nearest that of *Bidens Fischeri* (O. Hoffm.) Sherff, of German East Africa. From that it differs in being more nearly glabrous, in having the exterior involucral bracts also the achenes much wider, etc.

EXPLANATION OF PLATE CXLI

Bidens taitensis: a, fruiting branch, ×0.63; *b*, detached leaf, ×0.63; *c*, exterior involucral bract, ×3.8; *d*, interior involucral bract, ×3.8; *e*, ray corolla, ×2.53; *f*, palea, ×3.8; *g*, disc floret, ×3.8; *h* (outer), *i* (inner), achenes, ×3.8; all from type.

170. **Bidens Fischeri** (O. Hoffm.) Sherff, Bot. Gaz. 76: 158. 1923. Pl. CXLII, figs. *a–h*.

Coreopsis Fischeri O. Hoffm. in Engler, Pflanzenw. Ost-Afr. C: 414. 1895.

Herbacea, parce hispida. Folia petiolata petiolis ±1 cm. longis, superiora (inferiora non visa) petiolo adjecto 4–11 cm. longa, membranacea, pinnatipartita segmentis lanceolatis crenato-dentatis acutis. Capitula cymam foliatam formantia, radiata, pansa ad anthesin 2.5–4 cm. lata et 6–8 mm. alta, pedunculata pedunculis usque ad 9 cm. longis. Involucri bracteae dorso hispidae; exteriores

7–9, lineares, 7–12 mm. longae, interioribus ovato-lanceolatis longiores. Flores ligulati circ. 8, lutei, ligula elliptico-obovati, apice non conspicue denticulati, demum circ. 1.5–1.8 cm. longi. Achaenia obcompressa, nigrescentia vel brunneo-nigra, exalata, antrorsum setosa, faciebus circ. 8–sulcata, apice exaristata vel biaristata aristis glabris brevissimis 0.2–1 mm. longis; corpore exteriora linearioblanceolata, 4–5 mm. longa et circ. 1.3–1.4 mm. lata, tuberculata; interiora angustiora, linearia, 8–9 mm. longa et 0.6–1 mm. lata.

Type specimen: Collected by *Fischer*, No. 354, lake district of central eastern Africa, January 29–February 13, anno ignoto (Berl.).

Distribution: Known only from type locality in central eastern Africa.

Specimens examined: *Fischer* 354 (type, Berl.).

EXPLANATION OF PLATE CXLII, FIGS. *a–h*

Bidens Fischeri: a, leaf, ×0.74; *b* (flowering) and *c* (subfruiting), heads, ×0.74; *d*, exterior involucral bract, ×3.73; *e*, interior involucral bract, ×3.73; *f*, palea, ×3.73; *g* (outer) and *h* (inner), achenes, ×3.73; all from type.

171. **Bidens Schimperi** Schz. Bip. ex Walp. Repert. 6: 168. 1846; Sherff, Bot. Gaz. 81, *pl. 3*. 1926. Pl. CXLII, figs. *i–q*, Pl. CXLIII, and Pl. CXLIV.

Bidens Schimperi var. *pilosa* Schz. Bip. ex Schweinfurth, Beitr. Fl. Aethiop. 142. 1867.

Bidens Buchingeri Schz. Bip. ex Schweinf. loc. cit.

Bidens prolixa S. L. Moore, Journ. Proc. Linn. Soc. 40: 116. 1911.

Bidens punctata Sherff, Bot. Gaz. 59: 302. 1915.

Bidens acutiloba Sherff, op. cit. 76: 147. 1923.

Bidens Schimperi var. *punctata* Sherff, op. cit. 85: 17. 1928.

Achaenia corpore tantum 3–5 mm. longa, aristis perspicue tenuibus 1.5–3 mm. longis . . . . . var. *β. leptocera.*

Achaenia corpore plerumque usque ad 9–16 mm. longa, aristis moderate tenuibus, 2.5–4 mm. longis . . . . . *B. Schimperi* sensu stricto.

Herba annua, erecta, inconspicue subhirto-pubescens vel interdum pilis articulatis perspicue candido-hispida, 5–15 dm. alta; caule tetragono, ramoso. Folia petiolata petiolis 0.4–3 cm. longis, petiolo adjecto 5–15 cm. longa, membranacea, numerosis punctulis obsita, breviter hispido-ciliata, (rarissime pinnata) plerumque bi- vel tripinnatisecta; lobis ovato-oblongis vel lineari-lanceolatis, basi cune-

atis, integris vel grosse inciso-dentatis, apice indurato-mucronulatis. Capitula non numerosa, tenuiter pedunculata pedunculis 4–13 cm. longis et fere semper nudis, radiata, pansa ad anthesin 2–4 cm. lata et 5–10 mm. alta. Involucrum turbinatum, pilis articulatis praecipue infra hispidum; bracteis exterioribus 5–9, foliaceis, spathulato-linearibus, apice obtusis subacutisve et indurato-apiculatis, pilis articulatis ciliatis, demum 10–17 mm. vel interdum tantum 4–7 mm. longis, junioribus ac senioribus interiores oblongo-lanceolatas saepius paulo vel etiam dimidio superantibus. Flores ligulati plerumque 8, flavi, ligula anguste elliptici, apice subintegri, ± 12 mm. longi. Achaenia brunnea vel liventia vel nigrescentia, utraque facie circ. 8-sulcata, ad margines atque facies saepius perspicue adrecteque tuberculato-hispida, apice setosa et biaristata (Schz. Bip. *triaristata* dixit probabiliter inaccurate; nulla triaristata vidi) aristis tenuibus, retrorsum plus minusve hamosis, 2.5–4 mm. longis; exteriora valde obcompressa vel plana, circumambitu lineari-fusiformia, corpore usque ad 9–12 (–14) mm. longa et 2–2.6 mm. lata; interiora linearia, intima saepe convoluta, corpore usque ad 1.6 (in cultu etiam usque ad 2.2) cm. longa et circ. 2 mm. lata.

Type specimen: Collected by *Wilhelm Schimper*, No. 1429, in valleys near Djeladjeranne, Abyssinia, September 27, 1840 (Par.).

Distribution: Eastern Africa, from Eritrea and Nubia southward to Natal; also in Angola.

Specimens examined: *C. E. F. Allen* 434, Rhodesia (Kew); *E. Battiscombe* 63, coast districts, British East Africa, June 24, 1909 (Kew); *J. T. Bent*, sea coast to alt. 1,200 meters, about 21° N. Lat., Nubia, 1896 (Kew); *Miss E. M. Bruce* 589, growing 4 ft. tall, among native cultivation by river, Uluguru Mts., Bunduki, German East Africa, January 20, 1934 (Kew; Field); *eadem* 603, eodem loco, January 22, 1934 (Kew; Field); *Cecil* 193, alt. 1,800–2,100 meters, Inyanga Mts., Manika, Rhodesia, December, 1899 (Kew); *Anita G. Curtis* 696, alt. 1,500–2,100 meters, damp, hilly woods, Loita Plains, British East Africa, July 8, 1923 (Gray); *Fred Eyles* 1302, extremely common, alt. 1,410 meters, headwaters at Gwelo, Rhodesia, April, 1918 (forma: Brit.; Kew; Rog.); *Rudolph Endlich* 384, alt. 1,200–1,300 meters, mixed forest zone between Kibohöhe and the Namui, Kilimanjaro, German East Africa, July, 1909 (Mun.); *Adriano Fiori* 1835, alt. 960 meters, Ghinda, Hamasen region, Eritrea, April 11, 1909 (Flor.); *John Gossweiler* 3330, not abundant, weedy annual of the Mossacolas at Kassuango Kuiriri, Angola, April, 1906 (Brit.); *J. Hannington*, 2–7° S. Lat., eastern tropical Africa, communic. 1883

(Kew); *W. Haygarth*, near Umzinyati River, Natal, January 21, 1893 (Brit.); ex *Reg. Hort. Romano*, cult. e sem. ab A. Terracciano et A. Pappio lectis sub numero 4713 (Flor.); ex *eodem*, e sem. ab A. Pappio anno 1893 sub numero 4766 (Flor.); *Hort. Vindob.*, cult. anno 1869 e seminibus ex Horto Pragensi anno 1868 missis (U.V.; forma capitulis demum maximis, achaeniorum corporibus usque ad 2.2 cm. et aristis usque ad 4 mm. longis); *W. P. Johnson* 50, Likoma Isl., Lake Nyassa (Kew); *idem* 341, Tumbi Hill, Tumbi (Makapula), April 27, circ. 1901 (Kew); *idem* 343, Tumbi, eodem tempore (Kew; type of *Bidens punctata* Sherff); *J. Kirk*, Lupata, State of East Africa, April, 1860 (Kew); *J. K. Lord*, sandy plains, Suakin to Tamanieb River, Nubia, February 17, 1869 (Kew); *F. D. & E. J. Lugard* 177, Kwebe, Ngamiland, northern Bechuanaland, February, 1897 (Kew); *Mrs. E. J. Lugard* (similiter) 177, Kwebe Hills, Ngamiland, February 15, 1898 (Kew); *Mrs. Macaulay* 633 p.p., near Mumbwa (15° S. Lat. and 28° E. Long.), northern Rhodesia, 1911 (Kew); *J. McClounie* 133, alt. 2,400 meters, Nyika Plateau, British Central African Protectorate, February–March, 1903 (Kew, 2 sheets); *Menyhart* 1109, grassy places, Boruma (Mburuma; Boroma; about 400–500 km. above Tete on Zambesi River), northern Rhodesia, April, 1891 (U.V.); *A. Pappi* 3281, alt. about 1,500 meters, Eritrea, 1893 (Flor.); *Von Prittwitz und Gaffron* 353, abundant at Camp Kirangwana, German East Africa, July 17–18, 1901 (Berl.); *F. A. Rogers* 6001, alt. 900 meters, common from Victoria Falls to Wankie, south bank of Zambesi River, southern Rhodesia (17° 54′ S. Lat. and 25° 55′ E. Long.), April 3, 1909 (Kew); *idem* 7707, Broken Hill, northwestern Rhodesia, May, 1914 (Kew; forma *B. rufovenosae* adpropinquans sed involucro valde differt); *idem* 8007, Choma, northwestern Rhodesia, May, 1909 (Kew); *idem* 13225, alt. 720 meters, Wankie, southern Rhodesia, May, 1915 (Rog.); *Schilling* 67, Kilimanjaro District, German East Africa, 1903 (Berl.); *W. Schimper* 201, on mountain and in valley, alt. 750–1,650 meters, Hamedeo, Abyssinia, September 12, 1862 (Berl., 2 sheets; Brit.); *idem* 304, alt. 1,800 meters, in mountains, Gaha-Meda near Dschadscha, Abyssinia, October 22, 1854 (Berl., 2 sheets); *idem* 949, Abyssinia (Kew; Par., 4 sheets); *idem* 1429 (type, Par.: cotypes, Berl., 2 sheets: Del., 3 sheets; Gray; Kew, 2 sheets; Mo.; Mun.; Mus. V., etc.); *H. J. Schlieben* 1065, bed of the upper Ruhudje, Prov. Lupembe, German East Africa, 1931 (Bruss.); *G. Schweinfurth* 417, Soturba Mts., coast of Nubia, 1865–1868 (Berl.; Brit.); *C. F. M. Swynnerton* 1884, alt. 60-180 meters, Northern Melsetter, Rhodesia, April, 1907 (Brit., type of *Bidens prolixa* S. L.

BIDENS UKAMBENSIS S. L. Moore (figs. *a–i*)
BIDENS RHODESIANA Sherff (figs. *j–p*)

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Moore); *A. J. Teague* 6, alt. 900–1,500 meters, Odzani River Valley, Distr. Manica, Div. Umtali, Southern Rhodesia, 1914 (Kew); *A. Terraciano & A. Pappi*, Eritrea, April 3, 1892 (Flor.) and April 5, 1892 (Flor.); *Georg Volkens* 384, alt. 1,500 meters, Kiva Kinabo, June, 1893 (type material of *Bidens acutiloba* Sherff; Boiss.; Brit.; Kew); *T. Wakefield*, Galla Country, eastern tropical Africa, May, 1880 (Kew; forma plus gracilis); *J. M. Wood* 1231, Umzinyati Falls, Inanda, Natal, March 11 (Kew, recept. September, 1881).

The material originally given by Schultz Bipontinus the manuscript name *Bidens Buchingeri* and later given the name *B. Schimperi* var. *pilosa* was collected by Schimper at Gaha-Meda near Dschadscha, Abyssinia. The specimens examined by me in Schultz Bipontinus' herbarium (Par.) are merely a somewhat pilose-leaved but glabrous-stemmed form of *B. Schimperi*. We must therefore follow the course of Oliver and Hiern (Oliver, Fl. Trop. Afr. 3: 394. 1877) and treat these names as synonymous.

Many species of *Bidens* are polymorphic as to foliage, and yet reasonably constant as to characters of flower and fruit, but *B. Schimperi* offers an amazing range of variation in all respects. Thus, in typical *B. Schimperi* the external bracts of the involucre become 10–17 mm. long, but in forms of the species (of which *B. acutiloba* Sherff must be considered one) these may become only 3–6 mm. long. Again, in typical material, the achenial bodies range in length from 0.9–2.2 cm., while in various forms these range as low as 3–6 mm. long. Oliver and Hiern, also Otto Hoffmann, in their work on the African flora came to recognize a large number of these forms as merely variations of *B. Schimperi*, although to a novice these would seem separate species.

Bidens prolixa S. L. Moore was founded upon *C. F. M. Swynnerton* 1884, northern Melsetter at alt. 60–180 meters, Rhodesia, April, 1907 (Brit.). Moore (loc. cit.) distinguished this plant from *B. Schimperi* by "its slender habit with long stalked heads, its smaller leaves with narrower lobes, its smaller heads, shorter involucres and narrower ligules." Upon comparison with a considerable number of specimens of *B. Schimperi*, *B. prolixa* is found to be connected much too closely for specific separation.

B. punctata Sherff (Pl. CXLII, figs. *i–q*) was founded upon two sheets of material (Kew) consisting of small plants with leaves tripartite or even entire, not bi- or tripinnate as in ordinary *B. Schimperi*. Their outer involucral bracts were noticeably shorter than the inner ones. The fruiting characters were very similar to

those of *B. prolixa*, and I therefore came later to regard *B. punctata* and with it the less extreme *B. prolixa* as representing a variety (var. *punctata*) of *B. Schimperi*. The diagnostic characters are found, however, to be so uncorrelated and so prone to appear in different combinations, that it seems difficult to justify maintenance of even varietal rank for the *prolixa* or *punctata* forms.

Bidens Schimperi var. *β.* **leptocera** Sherff,
Bot. Gaz. 81: 52. 1926.

Herba erecta, ±6 dm. alta, verisimiliter annua, caule glabro et ramoso. Folia superiora (inferiora non visa) subsessilia, usque ad 6 cm. longa, bipinnatisecta segmentis linearibus vel lineari-lanceolatis, valde membranaceis, sparsim hispidis, ciliatis, acriter dentatis, 1–5 mm. latis. Capitula tenuiter pedunculata pedunculis usque ad 6 cm. longis, radiata, pansa ad anthesin circ. 2.5 cm. lata et 6–8 mm. alta. Involucri bracteae moderate hispidae, exteriores 5–8, lineares, acriter indurato-apiculatae, 3–6 mm. longae, interioribus ovato-lanceolatis parce longiores. Flores ligulati probabiliter circ. 8 (in uno capitulo imperfecto tantum 5 observati), lutei, ligula elliptico-oblanceolati, apice obscure denticulati, circ. 8–10 mm. longi. Achaenia parva valde obcompressa, ovato-oblanceolata vel lineari-oblonga, exalata, atra vel atro-fusca, utraque facie circ. 8–striata, marginibus erecto-ciliata, faciebus erecte plus minusve spinuloso-setosa, apice setis erectis valde et perspicue coronata, corpore tantum 3–4.5 (rarissime –5) mm. longa et 0.8–1.1 mm. lata, biaristata; aristis perspicue tenuibus, leviter arcuatis, solum apice retrorsum hamosis, 1.5–3 mm. longis.

Type specimen: Collected by *C. F. M. Swynnerton*, No. 845*A*, Kilossa, German East Africa, May 8, 1921 (Brit.).

Distribution: Known only from type locality in German East Africa.

Specimens examined: *Swynnerton* 845*A* (type, Brit.).

In addition to the single specimen cited, we have *Swynnerton* 875 (Brit.), which may prove closer to the variety than to the species proper. It was collected at Handeni, German East Africa, February, 1920, and has a habit suggesting that of the South American *Bidens Andrei*.

EXPLANATION OF PLATE CXLII, FIGS. *i–q*

Bidens Schimperi: i, small flowering and fruiting specimen, ×0.74; *j*, leaf, ×0.74; *k*, portion of leaf, magnified to show punctate surface, ×5.22; *l*, exterior involucral bract, ×3.73; *m*, interior involu-

cral bract, ×3.73; *n*, ray corolla, ×3.73; *o*, palea, ×3.73; *p*, disc floret, ×3.73; *q*, achene, ×3.73; *i*, *l–q*, from *Johnson* 343 (type of *Bidens punctata* Sherff), in Hb. Kew; *j*, *k*, from *Johnson* 341, in Hb. Kew.

EXPLANATION OF PLATE CXLIII

Bidens Schimperi: a, flowering and fruiting specimen, ×0.6; *b*, exterior involucral bract, ×2.41; *c*, interior involucral bract, ×2.41; *d*, ray corolla, ×2.41; *e*, palea, ×2.41; *f*, disc floret, ×3.61; *g* (outer), *h* (inner), achenes, ×3.61; all from cotype, in Hb. Kew.

EXPLANATION OF PLATE CXLIV

Bidens Schimperi (forms of): *a*, *j*, flowering and fruiting specimens, ×0.6; *b*, portion of leaf from *a*, enlarged to show pubescence, ×3; *c*, *k*, exterior involucral bracts, ×3; *d*, *l*, interior involucral bracts, ×3; *e*, *m*, ray corollas, ×3; *f*, *n*, paleae, ×3; *g*, *o*, disc florets, ×3; *h* and *p* (outer), *i* and *q* (inner), achenes, ×3; *a–i*, from *Volkens* 384 (type of *Bidens acutiloba* Sherff), in Hb. Boiss.; *j–q*, from *Schilling* 67, in Hb. Berl.

172. **Bidens Onisciformis** Sherff, Bot. Gaz. 96: 144. 1934.

Herba, unico ramo viso gracili subtereti sulculato sparsissime piloso internodiis folia superantibus. Folia tenuiter petiolata petiolo ±5 mm. longo adjecto sub 3 cm. longa, hispida setis pluriloculatis, bipinnatisecta segmentis ultimis membranaceis plus minusve oblongis acriter apiculatis vel dentatis dentibus vix mucronatis. Capitula pauca, tenuiter pedunculata pedunculis superne hispidis ±3 cm. longis, ad anthesin cernua circ. 2 cm. lata et circ. 6 mm. alta, disco parvo demum circ. 6–7 mm. lato. Involucri hispidi bracteae exteriores circ. 8, patentes, lineares, ±5 mm. longae, quam interiores ovatae saepe paulo longiores. Flores ligulati 6 (pro unico capitulo ad anthesin viso), flavi, ligula elliptico-oblanceolati, apice vix denticulati, 8–10 mm. longi. Paleae lineari-oblongae, apice obtusae vel raro irregulariter mucronatae, circ. 5–5.5 mm. longae. Achaenia exteriora fertilia, obcompressa, moderate vel late oblonga, nigra, dorso ±8-sulculata et glabrata, marginibus pectinato-dentatis vel laceratis sursum albido-setosa, non vere alata, ventro circ. 8-sulculata et valde papillato-setosa setis albis, apice bidenticulata (sed vix aristulata) et erecte setosa, 4–5 mm. longa et 1.5–1.8 mm. lata; interiora sterilia planiora, elongatiora, angustiora, griseo-nigra.

Type specimen: Collected by *Van den Houdt*, No. 211, at altitude of about 2,200 meters, W. Katana (Kivu), tropical east Africa, 1932 (Terv.).

Distribution: Northeastern Belgian Congo.

Specimens examined: *Van den Houdt* 211 (type, Terv.).

The outer achenes offer a strong superficial resemblance to sow bugs, of the genus *Oniscus*, whence the trivial name.[1]

173. **Bidens Hoffmannii** Sherff, Bot. Gaz. 76: 146, *pl. 12, figs. h–n.* 1923. Pl. CLI, figs. *j–p.*

Planta gracilis, glabra, circ. 3–5 dm. alta; caule inferne lignescenti, angulato vel obscure tetragono, ramoso. Folia tenuiter petiolata petiolis inferne plus minusve ciliatis 4–9 mm. longis, petiolo adjecto 2–5 cm. longa, pinnata, foliolis linearibus 1–3 mm. latis, lateralibus (1 vel 2 jugis) usque ad 2 cm. longis, terminali paulo longiore, omnibus integris vel remote pinnato-dentatis, subcarnosis, eciliatis, acute calloso-apiculatis. Capitula pauca, tenuiter pedunculata pedunculis 3–9 cm. longis, radiata, pansa ad anthesin 2.5–3 cm. lata et 6–9 mm. alta. Involucrum moderatim hispidum, bracteis exterioribus circ. 6, linearibus, apice acutis callosisque, 4–6 mm. longis; interioribus lanceolatis, paulo longioribus. Flores ligulati circ. 8, flavi, ligula elliptico-oblongi, apice integri vel acute 2- vel 3-denticulati, 1–1.5 cm. longi. Achaenia subnigra vel cinerea, supra brunnea, obcompressa, exalata, utraque facie 8-sulcata, antrorsum hispida, saepe tuberculata, linearia, paleas facile superantia, corpore exteriora 6–7 mm. longa et fere 2 mm. lata, interiora 7–9 mm. longa et 1–1.5 mm. lata, omnia biaristata aristis retrorsum hamosis, 1.5–1.75 mm. longis.

Type specimen: Collected by *Georg Volkens*, No. 365, at altitude of 1,400–1,500 meters, Kwa Kinabo, District of the Ngowe, Kilimanjaro, German East Africa, June 11, 1893 (Boiss.).

Distribution: Known only from type locality, Kilimanjaro, German East Africa.

Specimens examined: *Volkens* 365 (type, Boiss.: cotypes, Berl.; Brit.).

The type had been determined at Berlin as a form of *Bidens leariloba* Oliv. That species is a very different plant, having the exterior involucral bracts 9–13, linear-lanceolate or even narrowly linear, strongly attenuate above, finally more or less reflexed, 6–11 mm. long; also anomalous inner paleae, which are widely elliptic or obovate or truncate, the apex conspicuously and to a great length linearly elongated, surpassing the spreading-awned achenes. The habit is that of *Bidens Kirkii* (Oliv. & Hiern) Sherff, but the fewer

[1] The name *Oniscus* was taken in its restricted sense as used in modern Latin by zoologists, rather than from the Greek.

heads of *B. Hoffmannii*, the shorter, more often lobed and less parallel-sided leaf divisions, and the retrorsely barbed awns of the longer achenes distinguish it easily from *B. Kirkii*. The species was named in honor of Dr. Otto Hoffmann, who not only studied this and other material collected by Volkens, but during his lifetime[1] contributed in a most important way to knowledge of the African species of *Bidens*.

EXPLANATION OF PLATE CLI, FIGS. *j–p*

Bidens Hoffmannii: j, flowering and fruiting specimen, ×0.6; *k*, exterior involucral bract, ×3.6; *l*, interior involucral bract, ×3.6; *m*, ray corolla, ×3.6; *n*, palea, ×3.6; *o*, disc floret, ×3.6; *p*, achene, ×3.6; all from type.

174. **Bidens Kirkii** (Oliv. & Hiern) Sherff, Bot. Gaz. 59: 309. 1915. Pl. CXLV.

Coreopsis Kirkii Oliv. & Hiern in Oliver, Fl. Trop. Afr. 3: 390. 1877.

Foliorum laminae segmentave linearia 1–3.3 mm. lata; involucri bracteis exterioribus circ. 4 vel 5 . . . . . *B. Kirkii* sensu stricto.

Foliorum laminae segmentave flagellaria sub 1 mm. lata; involucri bracteis exterioribus circ. 8–10 . . . . . var. *β. flagellata*.

Suffruticosa, perennis, glaberrima, 3–5 dm. alta, infra ramosa ramis ligneis et teretibus vel obsolete tetragonis. Folia tenuiter petiolata petiolis 1–3.3 cm. longis, petiolo adjecto 3–7 cm. longa, interdum (forsitan plerumque) in ramulis adbreviatis genita, trisecta vel profunde tripartita, foliolis indivisis vel rursus tripartitis; segmentis linearibus, integris, crassiusculis, apice acutis, margine non ciliatis sed subrevolutis, 0.4–3.5 cm. longis et 1–3.3 mm. latis. Capitula solitaria vel perpauca, radiata, pansa ad anthesin 2–3.5 cm. lata et 6–10 mm. alta, tenuiter pedunculata pedunculis 1.5–8 (interdum –15) cm. longis. Involucrum glabrum; bracteis exterioribus circ. 4 vel 5, anguste lateve linearibus, plerumque apicem versus orbiculato-dilatatis, non ciliatis, 4–5 mm. longis, interiores lanceolatas fere aequantibus. Flores ligulati circ. 5, flavi, ligula obovati vel lineari-oblanceolati, 1.5–1.7 cm. longi. Achaenia linearia, nigrescentia, antrorsum hispida, corpore circ. 7 mm. longa, 1.2–1.6 mm. lata, paleas non aequantia, biaristata aristis antrorsum hispidis, 2–3 mm. longis.

Type specimen: Collected by *J. Kirk*, at altitude of 900 meters, Moramballa, Mozambique District, State of East Africa, December 30, 1855–1858 (Kew).

[1] For an account of his life and work see P. Ascherson, Verh. Bot. Ver. Brandenb. 51: 153. 1909; R. Muschler, ibid. 155.

Distribution: Southern British East Africa southward through German East Africa to Mozambique District of State of East Africa.

Specimens examined: *R. Dümmer* 2641 p.p., alt. 1,200 meters, grassy hill slopes, "Kyabana" (Kyalana?), Nov., 1915 (U.S.); *G. F. Scott Elliot* 6909, alt, 2,400 meters, Mt. Mau, British East Africa, 1893–1894 (Brit.; Kew); *R. E. & T. C. E. Fries* 571, alt. 2,300 meters, grassy field, near Forest Station, British East Africa, December 30, 1921 (Kew); *C. Holst* 913*f*, grass meadows, Kwa Mstuza, Distr. Usambara, German East Africa, August, 1893 (Hamb.; Kew; U.S.); *F. J. Jackson*, tropical eastern Africa, 1889 (Brit.); *H. H. Johnston*, Nandi Plateau, British East Africa, communic. 1901 (Kew); *J. Kirk*, alt. 900 meters, etc. (type, Kew); *E. A. Mearns* 1364 and 1418, alt. about 3,630 meters, in "giant heath" zone, western slopes of Mt. Kenia, British East Africa, September 21–27, 1909 (U.S.); *Domenico Riva* (*Exped. Eugenio Ruspoli*) 1447 (1244), Biddumi, Somaliland, September 12, 1893 (Flor.).

Bidens Kirkii var. *β.* **flagellata** Sherff, Bull. Jard. Bot. Brux. 13: 287. 1935.

Folia inferiora tripartita alia simplicia, 4–8 cm. longa, lamina segmentisve flagellaribus sub 1 mm. latis. Capitula pansa ad anthesin sub 2 cm. lata. Involucri purpureo-maculati bracteae exteriores circ. 8–10, ad anthesin sub 3 mm. longae. Flores ligulati circ. 8.

Type specimen: Collected by *Muller*, No. 50, Kitega, Ruanda, northwesternmost German East Africa, 1933 (Bruss.).

Distribution: Ruanda, German East Africa.

Specimens examined: *Muller* 50 (type, Bruss.).

EXPLANATION OF PLATE CXLV

Bidens Kirkii: a, flowering branch, ×0.63; *b*, exterior involucral bract, ×3.13; *c*, interior involucral bract, ×3.13; *d*, ray corolla, ×1.88; *e*, palea, ×3.13; *f*, disc floret, ×3.13; *g*, achene, ×3.5; *h*, immature achene, ×3.5; *a–f*, *h*, from type; *g*, from identical specimen by *Fred J. Jackson*, tropical east Africa, 1889, in Hb. Brit.

175. **Bidens musoziana** Sherff, Bot. Gaz. 86: 445. 1928. Pl. CXLVI.

Coreopsis arenicola S. L. Moore, Journ. Linn. Soc. 37: 170. 1905.

Bidens arenicola (S. L. Moore) Sherff, op. cit. 59: 309. 1915; non Gandoger, Fl. Lyon. 122. 1875.

Fruticulosa, erecta, crebro ramosa, ±4 dm. alta; caule glabro, una cum ramulis puberulis gracili subquadrangulatoque. Folia parva, petiolata petiolis 0.5–1 cm. longis, petiolo adjecto 1–3 cm. longa, pinnatim 5–partita vel bipinnatisecta; lobis linearibus, integris, supra moderate infra valde subadpresso-pilosis, apice acri induratis, plerumque 0.5–1.5 mm. latis. Capitula ad apices ramulorum corymbos laxos oligocephalos formantia, pedunculata pedunculis gracilibus et 2–5 cm. longis, radiata, pansa ad anthesin 1.4–2 cm. lata et 7–9 mm. alta. Involucrum pilosum; bracteis exterioribus circ. 8, anguste lineari-oblongis, subacutis, 2–3 mm. longis; interioribus late lanceolatis, integris vel bifidis, 5–6 mm. longis. Flores ligulati circ. 8, flavi, ligula oblongo-lanceolati, perspicue 11–nerves, apice integri, 1–1.3 cm. longi. Achaenia lineari-oblonga, obcompressa, brunneo-nigra vel nigrescentia, inferne leviter ac gradatim attenuata, utraque facie subtiliter costata, omnino circ. 16-sulcata, superne adrecte plus minusve pilosa ac ciliata, corpore 6–8 mm. longa, plerumque aristata; aristis 2, brevissimis, subcalvis vel perspicue adrecteque hispidulis, 0.1–0.7 mm. longis.

Type specimen: Collected by *Arthur William Gerrard Bagshawe*, in dry sand by Lake Victoria Nyanza, at Musozi,[1] Uganda, British East Africa, December 18 (not "12"), 1903–1904 (Brit.).

Distribution: Known only from type locality in Uganda, British East Africa.

Specimens examined: *Bagshawe*, Musozi (type, Brit.).

EXPLANATION OF PLATE CXLVI

Bidens musoziana: a, flowering and fruiting branch, ×0.66; *b*, leaf magnified to show pubescence, ×0.66; *c*, exterior involucral bract, ×2.66; *d*, interior involucral bract, ×2.66; *g*, *h*, disc florets, ×2.66; *i* (outer), *j* (inner), achenes, ×2.66; all from type.

176. **Bidens Mossii** Sherff, Bot. Gaz. 92: 202. 1931.
Pl. CXLVII.

Coreopsis tripartita M. B. Moss, Kew Bull. 1929: 184 and 196. 1929.

Herba erecta, gracilis, forsan 3–6 dm. alta, caule ramisque subteretibus glabris vel minute puberulis longitudinaliter striatis. Folia breviter lato-petiolata petiolis 2–6 mm. longis, petiolo adjecto circ. 2 cm. longa, tripartita; foliolis lineari-oblongis, glabris, apice breviter mucronatis, integris vel terminali lateraliter 1–2-lobato, marginibus plus minusve revolutis sed eciliatis, plerumque 1–2.5 mm.

[1] Spelled also Msozi (Century Atlas, 1899).

latis. Capitula solitaria, terminalia, tenuiter pedunculata pedunculo puberulo circ. 4.5–6 cm. longo, radiata, pansa ad anthesin circ. 2.2–2.8 cm. lata et circ. 5.5–7 mm. alta. Involucri bracteae hispidae, exteriores 10–14, lineari-oblongae, superne plus minusve dilatatae, terminaliter submucronato-apiculatae, circ. 4–4.5 mm. longae, subpatentes; interiores oblongo-lanceolatae circ. 5–6 mm. longae. Flores ligulati circ. 9–12, flavi, ligula late lineari-oblongi, apice subintegri vel obscure 3-denticulati, 1–1.2 cm. longi. Achaenia deficientia; ovariis obcompressis, exaristatis, truncatis.

Type specimen: Collected by *Thomas Ford Chipp*, No. 80, at altitude of 3,000 meters, in meadows on Mt. Kinetti (Kineti), Imatong Mountains, southern Sudan, February 11, 1929 (Kew).

Distribution: Known only from type locality in southern Sudan.

Specimens examined: *Chipp* 80 (type, Kew).

A species deceivingly like *Bidens Whytei* (which apparently had not been studied by Miss Moss). From *B. Whytei* it appears to differ in its larger and less dilated exterior involucral bracts, its exaristate achenes, etc.

EXPLANATION OF PLATE CXLVII

Bidens Mossii: a, b, flowering branches, ×0.72; *c*, exterior involucral bract, ×5.74; *d*, interior involucral bract, ×5.74; *e*, ray corolla, ×4.31; *f, g*, paleae, ×5.74; *h, i*, disc florets, ×5.74; all from type.

177. **Bidens Whytei** Sherff, Bot. Gaz. 76: 145. 1923.
Pl. CXLVIII, figs. *a–g*.

Herba erecta, forsan annua (partem inferiorem non vidi), glabra, verisimiliter 4–8 dm. alta, ramis angulatis. Folia subsessilia vel petiolata petiolis latis ciliatis et 3–12 mm. longis, petiolo adjecto 1.5–4.5 cm. longa, superiora ac media (infima non vidi) ternati-vel pinnatisecta, segmentis lineari-oblongis vel lineari-oblanceolatis, integris, apice indurato-apiculatis, subcarnosis, margine plus minusve revolutis spinuloso-ciliatisque, basi angustatis subangustatisve et decurrentibus. Capitula longe ac tenuiter pedunculata pedunculis 5–21 cm. longis et nudis vel 1–3 foliolis foliolata, radiata, pansa ad anthesin 2.5–3 cm. lata et 9–11 mm. alta. Involucrum inferne hispidum; bracteis exterioribus 7–9, brevibus, late spathulatis et supra saepe orbiculato-dilatatis, apice obtuso apiculatis, sparsim ciliatis, tantum 2–3 mm. longis; interioribus oblongo-lanceolatis, 5–6 mm. longis. Flores ligulati circ. 8, aurei, ligula elliptico-oblanceolati, apice irregulariter dentati, 1–1.5 cm. longi. Achaenia (unum matu-

BIDENS GRANDIS Sherff

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rum ac multa immatura vidi) linearia, obcompressa vel plana, exalata, nigra, faciebus 16-sulcata, supra ad margines atque angulos adrecte strigosa, corpore ±7 mm. longa, biaristata; aristis tenuibus, retrorsum hamosis vel saepe sub medio 1–3 hamis suberectis abnormaliter munitis, circ. 2.5 mm. longis.

Type specimen: Collected by *Alexander Whyte*, near Nairobi, British East Africa, received at Kew in August, 1903 (Kew).

Distribution: Known only from the vicinity of Nairobi, British East Africa.

Specimens examined: *Whyte*, near Nairobi (type, Kew).

EXPLANATION OF PLATE CXLVIII, FIGS. *a–g*

Bidens Whytei: a, flowering and fruiting branch, ×0.61; *b*, exterior involucral bract, ×3.66; *c*, interior involucral bract, ×3.66; *d*, ray corolla, ×1.83; *e*, palea, ×3.66; *f*, disc floret, ×3.66; *g*, achene, ×3.66; all from type.

178. **Bidens gracilior** (O. Hoffm.) Sherff, Bot. Gaz. 76: 84. 1923; ibid. 81: 29. 1926. Pl. CXLIX, figs. *i–p*.

Coreopsis exaristata var. *gracilior* O. Hoffm. in Engler, Pflanzenw. Ost-Afr. C: 414. 1895.

Foliorum segmenta ultima linearia plerumque 1–1.5 mm. lata.
var. *β. ukerewensis*.

Foliorum segmenta ultima ovato-lanceolata vel lanceolato-linearia.
B. gracilior sensu stricto.

Herba perennis, gracilis, erecta, 4–7 dm. alta, caule angulato, ramoso. Folia petiolata petiolis tenuibus 0.5–2 cm. longis, petiolo adjecto 3.5–8 cm. longa, circumambitu triangulato-ovata, 1–2-pinnatipartita; segmentis ovato-lanceolatis vel lanceolato-linearibus, membranaceis, atropunctulatis, dentibus acerrime indurato-apiculatis. Capitula tenuiter pedunculata pedunculis 4–16 cm. longa, radiata, pansa ad anthesin 2.5–4 cm. lata et 6–9 mm. alta. Involucrum glabratum vel moderate pubescens; bracteis exterioribus 6–8, linearibus, acriter cartilagineo-apiculatis, 4.5–6.5 mm. longis, quam interioribus lanceolatis plerumque paulo brevioribus. Flores ligulati circ. 8, lutei, ligula elliptico-oblanceolati, apice obscure denticulati, 1.2–1.8 cm. longi. Achaenia linearia, obcompressa, atra, supra erecto-setosa, exalata, 4.5–6 mm. longa et 0.6–1 mm. lata, apice calva vel breviter biaristata aristis nudis vel retrorsum 1- vel 2-hamosis et tantum circ. 0.2–0.3 mm. longis.

Type specimen: Collected by *Franz Ludwig Stuhlmann*, No. 6403, Maramo, Mkamba (Mgambo), District of Usaramo, German East Africa, January, 1894 (Berl.).

Distribution: Near Indian Ocean Coast, easternmost German East Africa.

Specimens examined: *W. Holtz* 406, sandy soil, light places, Sachsenwald, Dar-es-Salaam, December 6, 1901 (Berl.); *Stuhlmann* 6403 (type, Berl.); *idem* 7584, Dar-es-Salaam, 1894 (Berl.); *idem* 8470, Dar-es-Salaam, September, 1894 (Berl.).

The two sheets of material (*Stuhlmann* 6403 and 7584) cited by Otto Hoffmann for his var. *gracilior* differ from his species proper (*Coreopsis exaristata* O. Hoffm. = *Bidens microcarpa* Sherff) in having the leaves less glandular-pubescent or sometimes even glabrate, their divisions finer and much more acute or even acuminate, the involucre less pubescent and the achenes not only 3–4 mm. long with all except the innermost ones oblanceolate, but rather 4.5–6 mm. long and all linear. The important achenial differences seem to have been overlooked by Hoffmann.[1] A specimen collected later by Holtz (No. 406, Dar-es-Salaam, German East Africa, December 6, 1901) in the immediate vicinity of the type locality, Usaramo,[2] agrees fairly well with the type as to foliage and involucre, and has likewise longer achenes. These important characters of foliage and achenes appear to entitle Hoffmann's variety to separate specific rank.

Bidens gracilior var. β. **ukerewensis** Sherff,
Bot. Gaz. 92: 203. 1931.

Folia bi-tripinnatipartita, segmentis ultimis linearibus moderate adpresso-hispidis plerumque 1–1.5 mm. latis; achaeniis exterioribus corpore circ. 4.5–5 mm. longis interioribus 6–7 mm. longis, omnibus tenuiter biaristatis aristis 0.5–1 mm. longis apice retrorsum 1–4-hamosis.

Type specimen: Collected by *Carl Uhlig*, No. 19, abundant along the shore line of Lake Victoria Nyanza (Lake Ukerewe), Ukerewe, German East Africa, April 20, 1904 (Berl.).

[1] Many mature achenes on the type, *Stuhlmann* 6403, have 1 or 2 minute aristae (0.2–0.3 mm. long) and several have these aristae retrorsely barbed with 1 or 2 barbs. Had Hoffmann noticed this character he certainly would have remarked upon it, probably even referring his specimen not to *Coreopsis* but to *Bidens*, since with him the retrorse-barb character was considered diagnostic of the genus *Bidens* (cf. Sherff, Bot. Gaz. 59: 305–308. 1915).

[2] Spelled also Uzaramo (Century Atlas, 1899).

Distribution: Known only from type locality in northwestern German East Africa.

Specimens examined: *Uhlig* 19 (type, Berl.).

EXPLANATION OF PLATE CXLIX, FIGS. *i–p*

Bidens gracilior: i (upper), *j* (lower), portions of flowering and fruiting specimen, ×0.6; *k*, exterior involucral bract, ×3; *l*, interior involucral bract, ×3; *m*, ray corolla, ×2.4; *n*, palea, ×3; *o* (outer), *p* (inner), achenes, ×3; all from type.

179. **Bidens microcarpa** Sherff, Bot. Gaz. 76: 84. 1923. Pl. CXLIX, figs. *a–h*.

Coreopsis exaristata O. Hoffm. in Engler, Pflanzenw. Ost-Afr. C: 414. 1895.

Herba perennis, gracilis, dense glanduloso-pubescens, 4–15 dm. alta, caule angulato, ramoso. Folia petiolata petiolis tenuibus 0.6–3 cm. longis, petiolo adjecto 2.5–5.5 (–15) cm. longa, circumambitu deltoidea vel triangulato-ovata, pinnatipartita; segmentis 3–5, grosse serratis vel pinnatifidis, membranaceis, atro-punctulatis. Capitula tenuiter pedunculata pedunculis plerumque 3–5 cm. longis, pauca, radiata, pansa ad anthesin 2.5–4 cm. lata et 6–8 mm. alta. Involucri puberuli bracteae exteriores 6–8, lineares, obtuse indurato-apiculatae, in capitulis juvenilibus patenti-reflexae, 4–6 mm. longae, quam interiores lanceolatae fere vel circ. dimidio breviores. Flores ligulati circ. 8, lutei, ligula oblongo-elliptici vel oblanceolati, apice rotundati et obscure vel perspicue 3-dentati, 1.5–2 cm. longi. Achaenia minima, obcompressa vel subtetragona, oblanceolata vel intima linearia, atra, apice et sub apice erecto-setosa, saepe cupula minima coronata, exalata, 3–4 mm. longa et 0.6–1.2 mm. lata, exaristata vel rarius obsoletissime 1–2-aristata.

Type specimen: Collected by *C. Holst*, No. 102, mountain meadows, Usambara, German East Africa, October, 1891 (Berl.).

Distribution: German East Africa and Belgian Congo.

Specimens examined: *Eick* 265, Kwai, Usambara, 1900–1901 (Berl.); *A. Engler* 872*a*, alt. 1,140 meters, in eagle-fern formation at Sangerawe above Monga, Belgian Congo, September 22, 1902 (Berl.); *C. Holst* 102 (type, Berl.); *idem* 207, on borders of plantations ("Pflanzungen"), Usambara, December, 1891 (Brit.); *idem* 5002, alt. 1,100 meters, Usambara (Berl.); *Meinhof* 40, among low bushes, Bumbuli, Usambara, December 16, 1902 (Berl.); *Frau Hauptmann Prince*, alt. 1,600 meters, Utschungwe Mountains, Uhehe Distr., 1899 (Berl.).

From most African species of *Bidens* this is easily distinguished by its minute achenes. The absence of wings as well as of any other distinctly *Coreopsoid* character made the transfer to *Bidens* seem advisable.

The habitat is in the tropical forest up to 1,600 meters or more in the mountains, ploughed-up areas in the virgin forest, low bush, edges of plantings, etc.

EXPLANATION OF PLATE CXLIX, FIGS. *a–h*

Bidens microcarpa: a, flowering and fruiting branch, ×0.6; *b*, larger cauline leaf, ×0.6; *c*, exterior involucral bract, ×3; *d*, interior involucral bract, ×3; *e*, ray corolla, ×2.4; *f*, palea, ×3; *g* (outer), *h* (inner), achenes, ×3; *a*, *c–h*, from type; *b*, from *Holst* 207, in Hb. Brit.

180. **Bidens palustris** Sherff, Bot. Gaz. 76: 148. 1923.
Pl. CL, figs. *a–g*.

Herba gracilis, erecta, verisimiliter perennis; caulibus plus minusve quadrangularibus, hinc illinc minute hispidis, circ. 5–6 dm. altis. Folia petiolata petiolis 5–12 mm. longis, petiolo adjecto 1.5–6 cm. longa, 1–2 (raro –4)-pinnata, segmentis linearibus, faciebus glabris, margine sparsim ciliatis, apice acutis, 0.5–1.2 mm. latis et plerumque 1–2 cm. longis. Capitula tenuiter pedunculata pedunculis 5–10 cm. longis, radiata, pansa ad anthesin circ. 2.5 cm. lata et 6–8 mm. alta. Involucri bracteae exteriores circ. 6, lineares, ciliatae, non aliter nisi sparsim basi pubescentes, apicem versus non conspicue dilatatae, apice acutae, 3–4 mm. longae; interiores lanceolatae, circ. 6–7 mm. longae. Flores ligulati circ. 6, lutei vel fusco-lutei, ligula anguste elliptici, apice acriter dentati, circ. 1–1.2 cm. longi. Achaenia immatura circumambitu triangulato-linearia, obcompressa, deorsum ex apice angustata, atra, glabra vel ad apicem sparsim erecto-hispida, corpore adhuc circ. 3 mm. longa et 0.8 mm. lata, biaristata aristis 1.5–2 mm. longis et retrorsum hamosis. Planta *Bidenti Kirkii* habitu valde similis sed ligulis, involucri bracteis exterioribus, achaeniis, patria, etc., differt.

Type specimen: Collected by *T. Kassner*, No. 2599, in swamps, Kundelungu, Belgian Congo, March 13, 1908 (Berl.).

Distribution: From region of the Kundelungu Mountains, southeastern Belgian Congo, northeastward to region of Mt. Kenia, British East Africa.

Specimens examined: *Karl Braun* 1341, Orero-Knewa Kionidje, German East Africa, May, 1906 (Berl.); *W. J. Dowson* 630, alt.

BIDENS CORIACEA (O. Hoffm.) Sherff

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2,100 meters, stony ground at river's edge, Guaso Narok, Distr. Likipia (Leikipia), northeast slope of Mt. Aberdares, British East Africa (Kew); *G. F. S. Elliot* 6484, alt. 1,800 meters, Ukamba, British East Africa (Brit.); *Rudolph Endlich* 142, alt. 1,600 meters, bush steppe, Kilimanjaro, German East Africa (Berl.); *J. W. Gregory*, Guaso Nairotia, Distr. Likipia, British East Africa, 1893 (Brit.); *idem*, Guaso Larok, Likipia, 1893 (Brit.); *idem*, Guaso Laschau, Likipia, 1893 (Brit.); *R. L. Harger*, alt. 2,400 meters, Elgeyo Escarpment, Eldoret Distr., British East Africa, communic. 1926 (Brit.; forma foliis 3–4-pinnatis); *Kassner* 2599 (type, Berl.).

In 1908, *T. Kassner* spent at least several weeks among and around the Kundelungu Mountains, southwest of Lake Moero, in southeastern Belgian Congo. Among his plants received at the Botanical Garden of Berlin were no fewer than four new species of *Bidens* and *Coreopsis*.[1] Besides these he collected (*Kassner* 2710) the violet-rayed *Bidens urceolata* DeWild., described previously (Ann. Mus. Congo, Bot. IV. 1: 167. 1903) from a specimen (No. 464) obtained in 1900 by Verdick at Lukafu, a locality in this same region; also (*Kassner* 2859*a*) the red-rayed *Bidens rubra* DeWild., described more recently (Repert. Sp. Nov. 13: 203. 1914) from specimens (*J. Bequaert* 389, *Homblé* 563) obtained at Welgelegen.

DeWildeman (Ann. Mus. Congo IV. 2: 169. 1913) has referred this plant to *Bidens Kirkii* (Oliv. & Hiern) Sherff (*Coreopsis Kirkii* Oliv. & Hiern). A study of various specimens of *Bidens Kirkii* in European herbaria, however, shows several pronounced distinctions. *Bidens Kirkii*'s rays are light yellow, not dark or brownish orange-yellow; its exterior involucral bracts are mostly obtuse at the apex and below the apex noticeably dilated; its immature achenes are not widest at the apex as in *B. palustris*, nor are they practically glabrous, and their aristae are upwardly hispid, with numerous weak hairs, not downwardly barbed with a few spinulose hooks; finally, *B. Kirkii* does not appear from collectors' data to be a swamp-inhabiting species as *B. palustris* was observed to be.

EXPLANATION OF PLATE CL, FIGS. *a–g*

Bidens palustris: a, flowering specimen, ×0.64; *b*, exterior involucral bract, ×5.15; *c*, interior involucral bract, ×5.15; *d*, ray corolla, ×2.57; *e*, palea, ×5.15; *f*, disc floret, ×5.15; *g*, submature achene, ×5.15; all from type.

[1] *Bidens palustris, B. leptolepis, Coreopsis scabrifolia,* and *C. leptoglossa.*

181. **Bidens Schlechteri** Sherff, Bot. Gaz. 76: 146. 1923.
Pl. CLI, figs. *a–i*.

Coreopsis Schlechteri (Sherff) Burtt Davy, Kew Bull. 1935: 568. 1935.

Herba glabra, gracilis, 5–9 dm. alta; caule parce ramoso, subtetragono, perspicue sulcato. Folia petiolata petiolis 0.7–1.5 cm. longis, petiolo adjecto 5–10 cm. longa, parce membranacea, pinnata vel bipinnata; segmentis linearibus 1.5–4 mm. latis (terminali usque ad 5 cm. longo), margine glabris vel breviter et inconspicue ciliatis, saepe revolutis, apice acuto induratis. Capitula pauca, tenuiter pedunculata pedunculis usque ad 16 cm. longis, radiata, pansa ad anthesin 3–4.5 cm. lata et 7–9 mm. alta. Involucri bracteae exteriores 5–8, lineares, basi hispidae, apice indurato obtusae vel acutae, 4–7 mm. longae; interiores lanceolatae, paulo longiores. Flores ligulati 6–8, flavi, ligula elliptico-ovati, 13–20-striati, apice integri vel obscure denticulati, 1.5–2 cm. longi. Achaenia nigro-brunnea, valde obcompressa, late oblongo-linearia, utrinque angustata vel moderatim linearia, faciebus leviter sed marginibus apiceque dense erecto-hispida, non vere alata, corpore 5–7 mm. longa et 1.4–2 mm. lata, biaristata; aristis circ. 1.5 mm. longis, plerumque nudis rariter ad apicem una spinula vel erecta vel retrorsa munitis.

Type specimen: Collected by *Rudolph Schlechter*, No. 4745, at altitude of 1,500 meters, on mountain slope, Houtboschberg, Pietersburg District, Transvaal, March 30, 1894 (Berl., 2 sheets).

Distribution: Transvaal and northward into German East Africa.

Specimens examined: (*Distrib.*) *H. G. Breyer* (*Transvaal Mus. Herb. No.*) 19567 (leg. *Louis Trichardt?*), Zoulpansberg, Transvaal, February, 1919 (Kew); *C. Holst* 2146, Gombelo-Schamben, February, 1893 (Kew; forma capitulis minoribus); *Moss & Rogers* 283, The Downs, Pietersburg, Transvaal, November 17 (Brit.); *F. A. Rogers* 20104, Pietersburg Distr., Transvaal (Kew); *Schlechter* 4745 (type and cotype, Berl.); *George Thorncroft* (*herb. No.*) 11275, alt. 840 meters, on veldt, Elands Valley, Barberton Distr., Transvaal, April, 1915 (Kew).

EXPLANATION OF PLATE CLI, FIGS. *a–i*

Bidens Schlechteri: a, flowering branch, ×0.6; *b*, lower cauline leaf, ×0.6; *c*, exterior involucral bract, ×2.4; *d*, interior involucral bract, ×2.4; *e*, ray corolla, ×1.8; *f*, palea, ×2.4; *g*, disc floret, ×2.4; *h*, *i*, achenes, ×3.6; all from 2 type sheets.

182. **Bidens kivuensis** Sherff, Bot. Gaz. 96: 145. 1934.

Bidens Steppia var. *Humbertii* Sherff, Bot. Gaz. 96: 146. 1934.

Achaenia exaristata vel minutissime aristata
B. kivuensis sensu stricto.

Achaenia perspicue biaristata.....var. *β. armata.*

Herba nunc basi suffruticosa forsan perennis, nunc manifeste herbacea atque annua, usque ad 2 m. alta, erecte ramosa, caule ramisque subtetragonis sparsissime hispidis setis articulatis. Folia petiolata petiolis tenuibus ±1.5 cm. longis hispidis setis patentibus pluriloculatis, petiolo adjecto 6–9 cm. longa, 2–3-pinnatisecta, segmentis ultimis lineari- vel lanceolato-oblongis membranaceis supra adpresse infra saepius patente hispidis acriter dentatis dentibus mucronatis sed non in setas productis. Capitula corymbose ad ramorum fines 3–5-adgregata pedicellis tenuibus pilosis setis patentibus subalbis pluriloculatis, radiata, pansa ad anthesin ±4.5 cm. lata et ±8 mm. alta. Involucri albido-hispidi bracteae exteriores circ. 8, oblongo-lineares, mediane 1-nervatae nervo atro, apice acutae, circ. 4–7.5 mm. longae, quam interiores oblongo-ovatae moderate longiores. Flores ligulati plerumque 8, flavi, ligula oblanceolate linearioblongi, apice integri, ±2.2 cm. longi. Paleae lineari-oblongae, circ. 5–6 mm. longae. Flores tubulosi tubo (ac corollae lobis aurantiacis) sparsim patenti-pilosi. Achaenia submatura plana, lineari-oblonga, anguste marginata, faciebus marginibusque inferne glabrata superne erecto-setosa, ±5.5 mm. longa et circ. 1.5 mm. lata, paleas superantia, apice erecte setosa et exaristata vel minutissime biaristata aristis glabris.

Type specimen: Collected by *Jean Lebrun*, No. 5467, a somewhat suffrutescent herb about 2 meters high, on savanna at 1,720 meters altitude, Mulungu, Belgian Congo, May, 1932 (first and second sheets, Terv.; third sheet, Field).

Distribution: Northeastern Belgian Congo.

Specimens examined: *Boutakoff* 6, alt. 1,700–1,900 meters, basin of Nyagezi and neighboring mountains, September–October, 1929 (Bruss.); *idem* 14, eodem loco et tempore (Bruss.); *idem* 39, eodem loco et tempore (Bruss.); *idem* 88, alt. 1,800–2,000 meters, Mt. Nyidunga, west of Nyagezi, between Ngezi and Ngweso, September, 1929 (Bruss.); *H. Humbert* 7593, alt. 2,400–2,790 meters, Biega Mts., west of Lake Kivu, eastern Belgian Congo, March, 1929 (Bruss., type of *B. Steppia* var. *Humbertii* Sherff); *Lebrun* 5467 (first and second type sheets, Terv.; third type sheet, Field); *Walter Robyns* 2280, alt. 1,800 meters, grassy savanna, between Gsare and Murannya, May 22, 1926 (Bruss., 2 sheets).

Bidens kivuensis var. *β.* **armata** Sherff, Bull. Jard. Bot. Brux. 13: 287. 1935.

A specie achaeniis biaristatis aristis tenuibus antrorsum hispidulis circ. 2 mm. longis differt.

Type specimen: Collected by *Boutakoff*, No. 57, at altitude of 1,700–1,900 meters, basin of Nyagezi and neighboring mountains, Belgian Congo, middle of September to beginning of October, 1929 (Bruss.).

Distribution: District of Great Lakes, northeastern Belgian Congo.

Specimens examined: *Boutakoff* 57 (type, Bruss.).

183. **Bidens Mildbraedii** Sherff, Bot. Gaz. 91: 308. 1931. Pl. CLII.

Herba perennis e radice lignescenti, erecta, probabiliter 7–12 dm. alta, ramis fastigiato-erectis; caule ramisque atropurpureis, glabris, angulato-teretibus vel subtetragonis. Folia petiolo adjecto 0.7–1.7 dm. longa, nunc indivisa, linearia, 2–7 mm. lata, superne ad apicem acerrimum sensim elongato-attenuata inferne in petiolum marginatum 2–3.5 cm. longum angustata; nunc supra petiolum utrinque anguste 1-lobata lobo tenuiter lineari 1–3 cm. longo et 0.5–2 mm. lato; nunc pinnatim 3- vel 5-partita, foliolis linearibus 1–4 mm. latis, inferioribus interne saepe rursus 1-lobatis, petiolo tenui 2–4 cm. longo; laminis segmentisve membranaceis, supra glabris infra glabris vel debiliter adpresso-hispidis, marginaliter parce subrevolutis sed hispido-ciliatis. Capitula corymbosa, tenuiter pedunculata pedunculis superne dense pilosis pilis patentibus, radiata, pansa ad anthesin circ. 2.8–3.4 cm. lata et 8–12 mm. alta. Involucri bracteae inferne valde superne debiliter hispidae; exteriores 8–10, lineari-oblongae, apice indurato-nitidae et saepius obtusae, 6–16 mm. longae; interiores ovatae, 6–9 mm. longae. Flores ligulati circ. 8, sicci atroflavi, lineari-oblongi, circ. 1–1.3 cm. longi et circ. 2–3.5 mm. lati, apice profunde acriterque lobulati lobulis 1–3 mm. longis. Paleae lineari-oblongae, subtiles, apice obtusae, demum 7–9 mm. longae et circ. 1 mm. latae. Achaenia lineari-oblonga, plana, brunneo-atra, utraque facie circ. 8-sulcata, faciebus marginibusque erecto-hispida, nunc parva, corpore 4.5–6 mm. longa et circ. 0.6–0.8 mm. lata, apice valde erecto-setosa et biaristata aristis erectis vel suberectis basaliter antrorsum hispidis aliter nudis 0.8–1.3 mm. longis; nunc majora, corpore 7–9 mm. longa et 1–1.6 mm. lata, apice subsetosa et biaris-

BIDENS CRATAEGIFOLIA (O. Hoffm.) Sherff

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tata aristis patentibus inaequaliter 0.5–1 mm. longis, nudis vel basaliter rarius erecto-setosis.

Type specimen: Collected by *Johannes Mildbraed*, No. 9777, at altitude of about 1,000 meters, Buar, Kamerun, July, 1914 (Kew).

Distribution: Known only from type locality in the Kamerun.

Specimens examined: *Mildbraed* 9386, alt. about 1,000 meters, Buar, May, 1914 (Kew); *idem* 9777 (type, Kew).

The two sheets examined are of material collected two months apart. The first sheet has two plants, collected in May. One has a sterile, leafy stem about 2.7 dm. tall; the other has a sterile stem about 2.4 dm. tall and a fertile stem about 6.2 dm. tall, bearing three fruiting heads. The leaves are of the more compound type and offer a strong superficial resemblance to those of the North American *Coreopsis Delphinifolia* Lam. The exterior involucral bracts are equal to or a fourth or third shorter than the interior ones. The achenes are the larger ones of the Latin description.

The second or type sheet bears material of a much better developed plant (or plants), collected in July. About two dozen heads are present. The leaves are simple or laterally 2-lobed. The exterior involucral bracts tend to greatly exceed the interior ones. The achenes are the smaller ones of the Latin description.

As these differences appear to be of a seasonal nature, it seems inadvisable to attempt any varietal distinction of one form from the other.

EXPLANATION OF PLATE CLII

Bidens Mildbraedii: a, b, c, portions of sterile and fruiting specimens, ×0.63; *d,* exterior involucral bract, ×4.41; *e,* interior involucral bract, ×4.41; *f,* ray corolla, ×3.15; *g,* palea, ×4.41; *h,* disc floret, ×6.3; *i, j,* achenes, ×4.41; all from *Mildbraed* 9386, in Hb. Kew.

184. **Bidens Bequaertii** DeWild. Repert. Sp. Nov. 13: 204. 1914. Pl. CLIII.

Herba glabra, e radice lignea et verisimiliter perennis, gracilis, ramosa ramis suberectis plus minusve tetragonis, usque ad 6.5 dm. alta. Folia petiolata petiolis alatis 0.5–3 cm. longis, petiolo adjecto 4–6 (rarius –9.5) cm. longa, inferiora 2- vel 3-pinnatisecta, superiora pinnatisecta vel tripartita, lobis linearibus usque ad 2.5 mm. latis, margine recurvatis, apice acriter mucronatis. Capitula solitaria ramos terminantia, pedunculata pedunculis tenuibus usque ad 13.5 cm. longis, radiata, pansa ad anthesin 3–4.5 cm. lata et 9–12 mm.

alta. Involucri bracteae exteriores 5–7, interdum breves, elliptico-subobtusae, glabrae vel sparsim pilosae, 3–5 (demum etiam –8) mm. longae, interiores oblongo-oblanceolatae 5–7 (demum etiam –9) mm. longae. Flores ligulati 5–7, lutei, ligula anguste elliptici vel lineares, circ. 2–3 mm. lati, apice 2–3-dentati, usque ad 2.2 cm. longi. Achaenia subrobusta, obcompressa, crasso-linearia, glabra, atra, utraque facie circ. 8-striata, corpore 9–13 mm. longa et 1–1.5 mm. lata, paleas maturas aequantia vel superantia, apice truncato 2- vel 3-aristata aristis suberectis retrorsum hamosis 3–4.5 mm. longis.

Type specimen: Collected by *Joseph Bequaert*, No. 270, at Elisabethville, Katanga, Belgian Congo, March, 1912 (Bruss., 2 sheets).

Distribution: Known only from Katanga, Belgian Congo.

Specimens examined: *Bequaert* 270 (type, Bruss., 2 sheets); *Corbisier* (*Homblé*) 605, Welgelegen, Katanga, 1912 (Bruss.).

EXPLANATION OF PLATE CLIII

Bidens Bequaertii: a, flowering and fruiting specimen, ×0.63; *b*, exterior involucral bract, ×2.5; *c*, interior involucral bract, ×2.5; *d*, ray corolla, ×2.5; *e*, palea, ×2.5; *f*, disc floret, ×2.5; *g*, achene, ×2.5; all from 2 type sheets.

185. **Bidens Hildebrandtii** O. Hoffm. Bot. Jahrb. 20: 234. 1894. Pl. CLIV.

Suffruticosa, glaberrima, sparsim ramosa ramis teretibus, circ. 2 m. alta. Folia tenuiter petiolata petiolis ±1.5 cm. longis, petiolo adjecto ±8 cm. longa, circumambitu ovata, bipinnatisecta segmentis ultimis oblongis, acutissimis, membranaceis, nigro-punctatis. Capitula in panicula laxa corymbosa oligocephala bracteata disposita, pedunculata pedunculis gracilibus 3–10 cm. longis, radiata, pansa ad anthesin 4–5 cm. lata et 1–1.3 cm. alta. Involucri glabri bracteae exteriores circ. 5, reflexae, lineares, moderate acutae, 4–7 mm. longae; interiores late lanceolatae, multo majores. Flores ligulati 6–8, lutei, ligula oblongo-oblanceolati, apice denticulati, 2–2.5 cm. longi. Achaenia lineari-oblonga, obcompressa, faciebus glabrata et 6–8-sulcata sed non costa mediana instructa, marginibus antrorsum spinuloso-ciliata, atra, corpore circ. 1.5 cm. longa et 1 mm. lata, biaristata; aristis late patentibus, gracilibus, primum plerumque retrorsum hamosis, demum fere omnibus antrorsum hamosis, longissimis (5–6.5 mm.).

Type specimen: Collected by *J. M. Hildebrandt*, No. 2432, at altitude of 600–900 meters, Taita (Teita) Mountains, British East Africa, February, 1877 (Berl.).

BIDENS KILIMANDSCHARICA (O. Hoffm.) Sherff

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Distribution: Known only from type locality, Taita Mountains, British East Africa.

Specimens examined: *A. P. Grenfell*, alt. 600 meters, Taita Hills (Kew); *Hildebrandt* 2432 (type, Berl.: cotypes, Brit.; Kew; Mus. V.; U.V.).

EXPLANATION OF PLATE CLIV

Bidens Hildebrandtii: a, flowering branch, ×0.69; *b*, exterior involucral bract, ×3.47; *c*, interior involucral bract, ×3.47; *d*, ray corolla, ×2.08; *e*, palea, ×3.47; *f*, disc floret, ×4.16; all from type.

186. **Bidens magnifolia** Sherff, Bot. Gaz. 90: 390, *pl. 4*. 1930. Pl. CLV.

Coreopsis frondosa O. Hoffm. in Engler, Pflanzenw. Ost-Afr. C. 414. 1899.

Herba perennis elata 1–3 m. alta caule ramisque glabris vel etiam hispidis valde striatis saepius atro-subpurpurascentibus. Folia tenuiter petiolata petiolis 1–4 (–7) cm. longis, petiolo adjecto 6–15 (–26) cm. longa, circumambitu ovata, pinnatipartita; segmentis ovatis vel saepius late lanceolatis, grosse serratis vel infimis pinnatifidis, numerosissime glanduloso-punctatis, nunc tantum infra secundum nervos pilosis nunc utrinque molliter hispidis, plerumque 1–4 cm. latis. Capitula laxe disposita, tenuiter pedunculata pedunculis glabratis usque ad 2 dm. longis, radiata, pansa ad anthesin 4–5.5 cm. lata et 1–1.2 cm. alta. Involucri bracteae aequilongae; exteriores circ. 8–12, lineari-lanceolatae vel late lineari-oblongae, herbaceae, dorso marginibusque saepe hispidae, saepe reflexae, 8–12 mm. longae et 1.5–3.5 mm. latae; interiores ovato-oblongae, apicaliter pubescentes. Flores ligulati 8, flavi, ligula oblongi vel obovati apice saepe acriter 2–3-dentati, 2–2.6 cm. longi et 0.6–1.4 cm. lati. Achaenia lineari-oblonga, obcompressa, dorso saepe subcarinata ventre circ. 8-sulcato plana sed nervo mediano tenui percursa, duabus faciebus praecipue supra erecto-setosa, exalata vel subalata, marginibus stramineis brunneisve erecto-setosa, corpore 4.5–7 mm. longa et circ. 1.1 mm. lata, apice setoso biaristata; aristis divergentibus, tenuibus, apicem versus 1–6 hamis retrorsum vel saepe (interdum etiam in eodem capitulo) antrorsum hamosis, 1–3 mm. longis.

Type specimen: Collected by *C. Holst*, No. 2252, distributed everywhere in clearings and growing 2–3 meters high, at Kwa Kiniarri, Nderema, German East Africa, February 23, 1893 (Berl.).

Distribution: German East Africa.

Specimens examined: *Albers* 204, growing 2–3 meters high at 1,600 meters alt., forest margins and burned-over areas, Kwai, October 22, 1899 (Berl.); *Anon.* [cf. *Eick*] 56, growing up to 2 meters high, in bush- and grassland, Kwai, September, 1899 (Berl.); *Braun* 671, Amani, May 12, 1905 (Berl., 2 sheets); *idem* 2682, Lutindi, eastern Usambara, August 15, 1909 (Berl.); *J. Buchwald* 263, growing 2.5 meters high at margin of litoral forest, Moop, Usambara, December 20, 1895 (Berl.); *Eick* 56, alt. 1,750 meters, "even now growing on the steppes," bush- and grassland, September 6, 1899 (Berl.; vix typica); *A. Haarer* 1471, alt. about 1,650 meters, Suji, Pari District, August, 1928 (Kew); *Holst* 2252 (type, Berl.: cotype, Hamb.); *idem* 9149*a*, in high forest clearings, Kwa Mstuza, Usambara, August 17, 1893 (Berl.; Hamb.; Kew); *Houy* 57 (*Exped. Hans Meyer No.* 1190), growing 1–2 meters high, Nsogiro Mts., Ussagara, Distr. Kilossa, Morogoro, November–December, 1911 (Berl.); *Münzner* (*Exped. Captain Fromm*) 35, growing 2 meters high along streams, Langenburg, July 30, 1908 (Berl.); *H. J. Schlieben* 74, north of the upper Ruhudje, Prov. Lupembe, January, 1931 (Bruss. 2 sheets); *Stuhlmann* 8912, alt. 1,400 meters, Kibungo, Uluguru, October 20, 1894 (Berl.); *idem* 9265, Uluguru, November 20, 1894 (Berl.); *Warnecke* 63, growing 1.5 meters high on prairie-like mountain slopes and in all forest clearings, alt. 700–900 meters, Amani (Berl.; Kew); *Albrecht Zimmermann* 63, alt. 900 meters, Amani, December, 1902 (Berl., 2 sheets).

EXPLANATION OF PLATE CLV

Bidens magnifolia: a, flowering branch, ×0.53; *b*, exterior involucral bract, ×3.15; *c*, interior involucral bract, ×3.15; *d*, ray corolla, ×2.63; *e*, palea, ×3.15; *f*, disc floret, ×3.15; *g* (outer), *h* (inner), achenes, ×4.2; *a–f*, from type; *g*, *h*, from *Albers* 204, in Hb. Berl.

187. **Bidens Taylori** (S. L. Moore) Sherff, Bot. Gaz. 59: 309. 1915. Pl. CL, figs. *h–o*.

Coreopsis Taylori S. L. Moore, Journ. Bot. 44: 22. 1906.

Verisimiliter perennis, erecta, ±1 m. alta; caulibus solitariis vel pluribus, subvalidis, demum denudatis; ramulis gracillimis et saepe irregulariter arcuatis, elongatis ac distanter foliosis, glaberrimis. Folia tenuiter petiolata petiolis 0.4–3 cm. (vel ultra) longis, petiolo adjecto 3–7 cm. longa, ab inflorescentia plus minusve remota, membranacea, alte bipinnatifida; segmentis ultimis late linearibus, apice acutis, glaberrimis sed glandulis nigris copiose instructis, non ciliatis,

0.5–2.5 mm. latis. Capitula in cymis elongatis oligocephalisque digesta (pedunculis propriis 4–10 cm. vel ultra longis, gracilibus glabrisque), radiata, pansa ad anthesin circ. 2–2.5 cm. lata et 6–8 mm. alta. Involucrum basi parce hispidulum; bracteis exterioribus circ. 8, linearibus, glabris vel basi ciliatis, acutis, 3–5 mm. longis; interioribus oblongo-lanceolatis, circ. 7 mm. longis. Flores ligulati circ. 8, exsiccati lutei, viventes dicti aurantiaci (a Gossweilero), ligula late oblongi, apice plerumque 3-denticulati, circ. 1.3 cm. longi. Achaenia lineari-oblonga vel lineari-clavata, obcompressa, utraque facie circ. 8-sulcata, nigrescentia, dimidio superiore vel etiam fere usque ad basim setis adscendentibus eximie tuberculato-scabrida, corpore 5–7.5 mm. longa et 0.8–1.2 mm. lata, apice calva vel setuloso-ciliata et saepe aristulis 1 vel 2 brevibus instructa; aristulis erecto- vel patenti- vel etiam recurvo-uncinulatis, vel saepe vero nudis, usque ad 1 mm. longis.

Type specimen: Collected by *W. E. Taylor*, in the bed of a torrent in a ravine at Rabai, Seyidie Province, British East Africa, January 5, 1886 (Brit.).

Distribution: Equatorial Africa from east to west coasts.

Specimens examined: *John Gossweiler* 3165, Cutchi River near the fort, Cutchi, Angola, May 4, 1901 (Brit.); *Taylor*, in torrent bed in a ravine, Rabai, etc. (type, Brit.).

Moore describes this species as "verisimiliter perennis." Gossweiler's label says "like perennial." While perhaps having a perennial root, the plant has somewhat the aspect of an annual. Its tall habit and smooth, very delicate, elongate, wiry branches, characters especially well marked in Gossweiler's plant, are distinctive. The heads look much like those of *Bidens Kirkii* (O. & H.) Sherff.

The remarkably discontinuous distribution displayed by *B. Taylori* in its occurrence, so far as at present known, only at or near the opposite coasts of Africa, led at first to my suspecting that the species might prove to be only a form of some older and better known species. It has been impossible, however, to find justification for reducing *B. Taylori* to synonymy with any other species.

EXPLANATION OF PLATE CL, FIGS. *h–o*

Bidens Taylori: h, leaf, ×0.64; *i*, portion of leaf, enlarged to show glands, ×3.2; *j*, exterior involucral bract, ×5.15; *k*, interior involucral bract, ×5.15; *l*, ray corolla, ×2.56; *m*, palea, ×5.15; *n*, disc floret, ×5.15; *o*, achene, ×5.15; all from type.

188. **Bidens Elliotii** (S. L. Moore) Sherff, Bot. Gaz. 59: 309. 1915. Pl. CLVI, figs. *i–p.*

Coreopsis Elliotii S. L. Moore, Journ. Linn. Soc. 35: 346. 1902; cf. Muschler, Wiss. Ergebn. Deutsch. Zentr. Afr. Exped. 1907–1908, 2: 381. 1911.

Bidens amoena Sherff, op. cit. 76: 144. 1923.

Frutex perennis, adscendens vel erectus, nunc 4–10 dm. nunc etiam usque ad 2 m. altus; caule glabro, obtuse tetgragono, demum fistuloso ac plus minusve stramineo-colorato, creberrime folioso, supra ramoso. Folia sessilia vel subtenuiter petiolata petiolis 1–4.5 cm. longis, petiolo adjecto 3–10 (vel etiam –17) cm. longa, bi- vel tripinnatisecta; segmentis vel lobulis anguste linearibus, apicem versus primum sensim demum saepe subabrupte angustatis, acutissime indurato-apiculatis vel rarissime dente in setam subtransformato munitis, parce hispidulis ac hispidulo-ciliatis, glandulis minutis numerosis conspersis, supra satis viridibus infra pallidioribus, 0.5–3 mm. latis. Capitula mediocria laxe corymbosa, pedunculata pedunculis mox puberulis 1–7 cm. longis, radiata, pansa ad anthesin 3–5.5 cm. longa et 7–11 mm. alta. Involucrum glabrum vel basi hispidum; bracteis exterioribus 8–12, comparate elongatis, superne angustatis, saepe acutis, squarroso-reflexis, 5.5–11 mm. longis, quam interioribus oblongo-lanceolatis lutescenti-marginatis paulo brevioribus vel saepe paulo longioribus. Flores ligulati 8–14, flavi, ligula obovato-oblongi vel lineari-oblanceolati, 10–13 striis percursi, styliferi, apice integri 1.2–3 cm. longi; ovario anguste recteque oblongo, corpore 3–4 mm. longo, bi- vel tri- (forsan interdum quadri-) aristato aristis sursum setulosis et 0.3–0.6 mm. longis. Achaenia linearioblonga, obcompresso-tetragona vel subplana, subpallide grisea vel griseo-nigrescentia, debiliter striata omnino 16 striis, faciebus summis et marginibus adrecte tuberculato-setosa, corpore 5–8 mm. longa et 0.9–1.3 mm. lata, apice setosa et biaristata; aristis tenuibus, antrorsum setulosis, 1–2.6 mm. longis.

Type specimen: Collected by *G. F. Scott Elliot*, No. 7724, in open places at altitude of about 2,880 meters, Kivata, vicinity of Mt. Ruwenzori, eastern equatorial Africa, May, 1893–1894 (Brit.).

Distribution: Vicinity of Mt. Ruwenzori southward to Lake Kivu region, east equatorial Africa.

Specimens examined: *Joseph Bequaert* 3685, alt. about 2,300 meters, Butagu, Mt. Ruwenzori, April 15, 1914 (Bruss.); *idem* 4461, alt. about 2,500 meters, Lanuri, Mt. Ruwenzori, May 24, 1914

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(Bruss., 2 sheets); *J. Claessens*, between Shangugu and Usambara, 1925 (Bruss., 2 sheets); *idem*, sine loco, 1929 (Bruss., 2 sheets); *M. T. Dawe* 582, alt. 2,100 meters, Distr. Ruwenzori, Uganda, British East Africa, 1905 (Kew); *DeWitte* 1895, Tropical East Africa, September 5, 1934 (Bruss.); *W. G. Doggett*, alt. 2,400 meters, Mt. Ruwenzori, communic. 1901 (Kew; type of *Bidens amoena* Sherff); *Elliot* 7724 (type, Brit.: cotype, Kew); *idem* 8018, among heather, alt. about 2,700 meters, Butagu, Mt. Ruwenzori, July, 1893–1894 (Kew); *H. Humbert* 7843, alt. 1,460–2,000 meters, between lakes Kivu and Edouard, Belgian Congo, April–May, 1929 (Mus. Cong., 2 sheets); *idem* 8479, alt. 2,200–2,700 meters, mountains, Ruanda, northwestern German East Africa, May, 1929 (Bruss.); *Johannes Mildbraed* 1386, alt. 3,000 meters, Ninagongo, Kissenye, Lake Kivu region, May 20, 1907 (Berl., 2 sheets); *idem* 1676, alt. 2,600 meters, among bamboos in mountain meadows, abundant in the heath formation, Sabyino (Sabinjo, Sabinio)–Kahinga Ridge, northeast of Lake Kivu, end of November, 1907 (Berl., 3 sheets); *idem* 1834, alt. 2,200 meters (fide Muschleri loc. cit.), Mt. Muhavura, northeast of Lake Kivu, December, 1907 (Berl., 2 sheets); *H. Scaetta* 197, alt. 3,000 meters, Mt. Muhavura (Bruss.); *A. F. R. Wollaston*, alt. 2,100 meters, Mt. Ruwenzori, January 29, 1906 (Brit.).

B. Elliotii was described originally from very mature, fruiting material, *B. amoena* from flowering specimens with scarcely mature achenes. The description of *B. Elliotii* has here been amended somewhat to include *B. amoena*.

EXPLANATION OF PLATE CLVI, FIGS. *i–p*

Bidens Elliotii: i, terminal portion of cauline leaf, ×0.61; *j*, lateral leaflet of cauline leaf, ×0.61; *k*, exterior involucral bract, ×1.83; *l*, interior involucral bract, ×1.83; *m*, ray floret, ×1.83; *n*, palea, ×1.83; *o*, disc floret, ×2.44; *p*, submature achene, ×3.66; all from *W.G. Doggett*, alt. 2,400 meters, Mt. Ruwenzori (type of *Bidens amoena* Sherff), in Hb. Kew.

189. **Bidens Phalangiphylla** Sherff, Bot. Gaz. 76: 152. 1923. Pl. CLVI, figs. *a–h*.

Herba gracilis, forsan perennis, parce erecta, glabra, usque ad 1 m. alta, caule tetragono, ramoso. Folia longe tenuiterque petiolata petiolis 1.5–4.5 cm. longis, petiolo adjecto 9–15 cm. longa, bipinnatisecta; segmentis primariis paucis remotisque, lateralibus tenuiter petiolulatis, omnibus 3–7-partitis lobis submembranaceis, crebro punctatis, linearibus, acriter apiculatis, non ciliatis, 0.6–3 mm. latis,

terminalibus elongatis usque ad 5 cm. longis. Capitula pauca, ramos terminantia, pedunculata pedunculis tenuibus circ. 8–10 cm. longis, radiata, pansa ad anthesin circ. 3 cm. lata et 7–8 mm. alta. Involucri bracteae exteriores circ. 8, lineares, acute calloso-apiculatae, basi subhispidae, 5–7 mm. longae, patentes; interiores lanceolatae, 6–8 mm. longae. Flores ligulati circ. 8, lutei, ligula anguste elliptici, apice parce vel raro profunde dentati, 1–1.3 cm. longi. Achaenia nigra, linearia, non elongata, plano-convexa, utraque facie glabra ac circ. 8-sulcata, marginibus superne erecto-ciliata, apice erecto-setosa, corpore 5.5–7 mm. longa et 1.1–1.3 mm. lata, biaristata aristis retrorsum hamosis fere 2 mm. longis.

Type specimen: Collected by *C. Holst*, No. 2967, at altitude of 30 meters, Doda, District of Usambara, German East Africa, June 28, 1893 (Berl.).

Distribution: Known only from type locality in District of Usambara, northeastern German East Africa.

Specimens examined: *Holst* 2967 (type, Berl.).

A species close to *Bidens Elliotii*, but having only about 8 ray florets, the about 8 exterior involucral bracts only 5–7 mm. long and scarcely equalling the interior, and the achenial aristae downwardly barbed. In *B. Elliotii* the ray florets number mostly 10–14, the usually 9–12 exterior bracts are more often 8–11 mm. long, and the achenial aristae are erectly hispid. *B. Phalangiphylla* is close also to *B. Bequaertii* DeWild., but has the much larger and more openly dissected leaves,[1] narrower exterior involucral bracts, and much smaller fruiting heads with smaller achenes.

EXPLANATION OF PLATE CLVI, FIGS. *a–h*

Bidens Phalangiphylla: a, flowering and fruiting specimen, ×0.61; *b*, cauline leaf, ×0.61; *c*, exterior involucral bract, ×1.83; *d*, interior involucral bract, ×1.83; *e*, ray floret, ×1.83; *f*, palea, ×1.83; *g*, disc floret, ×2.44; *h*, achene, ×3.66; all from type.

190. **Bidens insecta** (S. L. Moore) Sherff, Bot. Gaz. 59: 309. 1915. Pl. CLVII.

Coreopsis insecta S. L. Moore, Journ. Bot. 46: 42. 1908.

Herba erecta, glabra, forsan usque ad 1 m. alta; caulibus 1 vel pluribus e radice lignea, quadrangularibus, longitrorsum sulcatis, ramosis. Folia sessilia, inferiora 6–9 cm. longa, summa gradatim

[1] The spreading segments offer a fanciful resemblance to the legs of *Phalangium*, whence the trivial name.

BIDENS LINEATA Sherff

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imminuta, bipinnatifida; segmentis primi ordinis circumambitu lanceolatis acutisque 2–4 cm. longis, secundi lineari-oblongis 3–16 mm. longis, omnibus subcoriaceis glandulis immersis crebro indutis apice pungentibus margine revolutis eciliatisque, rhachi inferne circ. 1.5 mm. superne alata ac circ. 4–5 mm. lata. Capitula radiata, pansa ad anthesin circ. 4.6–5.2 cm. lata et ±1 cm. alta, pauca (saepissime 3 ex apice ramulorum singulorum ramorum orientia). Involucri ad basim parce hispidi bracteae exteriores circ. 8, anguste lineari-oblongae, acutae, crassiusculae, circ. 1–1.2 cm. longae et 1.5–2 mm. latae, interiores anguste ovato-oblongas obtusas chartaceas margine decoloratas aequantes vel leviter excedentes. Flores ligulati circ. 8, flavi (sed infra atriores), ligula oblongi vel late elliptico-oblanceolati, apice bidentati vel subintegri, plurinerves, circ. 1.8–2.3 cm. longi. Receptaculi paleae oblongae, obtusae, circ. 6 mm. longae. Achaenia vix matura, plana, griseo-fusca vel basi apiceque straminea, exalata, oblonga, faciebus marginibusque breviter adpresseque ad apicem dense setulosa, utraque facie circ. 8-sulcata, corpore ±5.5 mm. longa et ±1.2 mm. lata, biaristata; aristis nunc calvis nunc antrorsum 1–4-setosis, usque ad 1 mm. longis.

Type specimen: Collected by *Fred Eyles*, No. 266, common among tall grass, at altitude of 1,380 meters, Bernheim Hill, District of Mazoe, Southern Rhodesia (Brit.).

Distribution: Known only from type locality in District of Mazoe, Southern Rhodesia.

Specimens examined: *Eyles* 266 (type, Brit.).

EXPLANATION OF PLATE CLVII

Bidens insecta: a, flowering and fruiting specimen, ×0.62; *b*, exterior involucral bract, ×3.09; *c*, interior involucral bract, ×3.09; *d*, ray corolla, ×1.85; *e*, palea, ×3.09; *f*, disc floret, ×3.09; *g*, achene, ×3.09; *a*, mainly and rest, entirely from type.

191. **Bidens robustior** S. L. Moore, Journ. Linn. Soc. 35: 349. 1902. Pl. CLVIII.

Herba elata, erecta, probabiliter perennis, crebro ramosa ramis validis teretibus striatis solidis hispidulis deinde glabris, verisimiliter 7–10 dm. alta. Folia petiolata petiolis 1–2.8 cm. longis vel summa sessilia, petiolo adjecto 5–12 cm. longa, pinnatim triloba lobis ovatis vel ovato-lanceolatis acutis grosse crenato-serratis (dentibus callosoapiculatis) raro lobulatis, summa lanceolata, omnia supra scaberrima subtus hispidula. Capitula magna breviter vel mediocriter

pedunculata pedunculis 1–5 cm. longis, radiata, cymam paucicapitulatam strictam angustam sparsim foliatam folia longe excedentem efformantia, pansa ad anthesin circ. 5–6 cm. lata et circ. 1–1.2 cm. alta. Involucri bracteae 4-seriatae, eae 2 exteriorum serierum (circ. 9–13 ex toto) lineari-lanceolatae, utrinque hispidulae, basi ciliatae, reflexae, circ. 7–11 mm. longae; aliae lanceolatae, dorso hispidoscaberrimae, saepe breviores et saepe reflexae. Flores ligulati circ. 14, lutei, ligula oblongi, apice undulati vel obsolete denticulati, circ. 2.5 cm. longi et parce 1 cm. lati, circ. 12-nervosi. Achaenia linearioblonga, maxime obcompressa, atra, utraque facie debiliter 8-striata et leviter erecto-setosa, marginibus antrorsum ciliata, corpore 6–8 mm. longa et 1.5–1.7 mm. lata, quam receptaculi paleae perspicue breviora, biaristata; aristis retrorsum hamosis (hamis 1 vel rariter 2 vel etiam 3), 1.7–2 mm. longis.

Type specimen: Collected by *G. F. Scott Elliot* (*Mt. Ruwenzori Expedition*), No. 6846, at altitude of 1,800 meters, Elmentaita (Elmenteita), Masailand, German East Africa, 1893–1894 (Brit.).

Distribution: Masailand, German East Africa.

Specimens examined: *Elliot* 6846 (type, Brit.: cotype, Kew).

EXPLANATION OF PLATE CLVIII

Bidens robustior: a, flowering and fruiting specimen, ×0.59; *b*, exterior involucral bract, ×2.36; *c*, interior involucral bract, ×2.36; *d*, ray corolla, ×1.18; *e*, palea, ×2.36; *f*, disc floret, ×2.36; *g*, achene, ×2.36; all from type and cotype specimens.

192. **Bidens ambigua** S. L. Moore, Journ. Linn. Soc. 37: 322. 1906. Pl. CXLVIII, figs. *h–m*.

Herbacea, glabra, circ. 5 dm. alta e radice perenni (ex Gossweilero); caulibus pluribus (vel interdum tantum uno), gracilibus, simplicibus, adscendenti-erectis, sparsim foliosis, obtuse quadrangularibus, 1–1.5 mm. crassis. Folia sessilia, modica 2.5–3.5 cm. longa, alii indivisa alii paucilobatis; lamina vel lobis anguste linearibus, nunc obtusis nunc acutissimis et calloso-apiculatis, subcarnosis, non ciliatis, 1–1.5 mm. latis; lobis 3–8 mm. (forsan ultra) longis. Capitula terminalia, solitaria, tenuiter longipedunculata pedunculis 6–18 cm. longis, radiata, pansa ad anthesin circ. 2.5–3 cm. lata et 8–9 mm. alta. Involucrum glabratum vel basi parce hispidulum; bracteis exterioribus 3–5, lineari-lanceolatis, parce ciliatis, 5–7 mm. longis; interioribus ovato-lanceolatis, dimidio longioribus. Flores ligulati circ. 8, lutei, ligula elliptici, apice bidentati, circ. 1 cm. longi.

Achaenia nondum matura late oblonga, nequaquam alata, glabra vel fere glabra, biaristata; aristis quam corpore brevioribus dentibus perpaucis nunc erectis nunc recurvatis onustis vel etiam omnino calvis.

Type specimen: Collected by *John Gossweiler*, No. 1189, in open forests of *Berlinia* on left bank of River Quanze at Kiambella, Angola, July 23, 1903 (Brit.).

Distribution: Known only from type locality in Angola.

Specimens examined: *Gossweiler 1189* (type, Brit.).

EXPLANATION OF PLATE CXLVIII, FIGS. *h–m*

Bidens ambigua: h, flowering branch, ×0.61; *i*, exterior involucral bract, ×3.66; *j*, interior involucral bract, ×3.66; *k*, ray corolla, ×1.83; *l*, palea, ×3.66; *m*, disc floret, ×3.66; all from cotype, in Hb. Kew.

193. **Bidens ugandensis** (S. L. Moore) Sherff, Bot. Gaz. 59: 309. 1915. Pl. CLIX.

Coreopsis ugandensis S. L. Moore, Journ. Linn. Soc. 35: 347. 1902.

Herba perennis, erecta, 5–9 dm. alta, nunc molliter pubescens nunc caulibus ramisque vel etiam foliis glabrata; caulibus teretibus vel tetragonis, 2–4 mm. crassis. Folia non sessilia, petiolo 0.5–2.5 cm. longo adjecto 4–8 cm. longa, basi parce connata, nunc ternatim quinatimve pinnata nunc bipinnata; segmentis anguste linearibus (0.3–1 mm. latis), terminali lateralia plerumque superante. Capitula mediocria, solitaria vel pauca, tenuiter pedunculata pedunculis plerumque 3–10 cm. longis, radiata, pansa ad anthesin 2.5–3.5 cm. lata et circ. 6–8 mm. alta. Involucri bracteae biseriales, exteriores 7–10, pubescentes, oblongo-lineares, apice obtusae vel subacutae, 4–5.5 mm. longae et 0.6–1 mm. latae, quam interiores ovato-oblongae 7–8.5 mm. longae et 3–4 mm. latae margine scariosae dorso hispidulae apice moderatim obtusae satis breviores. Flores ligulati circ. 8, lutei, ligula late oblongi, apice saepe tridentati, circ. 1.4–1.6 cm. longi et 3–6 mm. lati. Achaenia paleas oblongo-lineares apice obtusas interdum superantia, olivaceo-brunnea vel brunneo-atra, anguste oblongo-linearia, obcompressa, exalata, margine apiceque erecto-ciliata, utraque facie unicostata et circ. 8-striata, ad summam costam saepe erecto-puberula, corpore 6–7 mm. longa et 0.6–1 mm. lata, biaristata, aristis tenuibus, nudis, plerumque patulis, tantum circ. 0.5–1 mm. longis.

Type specimen: Collected by *G. F. Scott Elliot*, No. 7520, dry schist hills, Buddu, Uganda, British East Africa, March, 1893–1894 (Brit.).

Distribution: British East Africa to Belgian Congo.

Specimens examined: *G. S. Baker* 312, alt. 1,200 meters, grassland, common from Muhoroni to Kisumi, British East Africa, December 12, 1905 (Kew); *Ernest Brown* 404, alt. 1,170 meters, District of Unyoro, Uganda, British East Africa, July, 1907 (Kew); *idem* 2651, alt. 1,260 meters, savanna, 100 miles northwest of Kampala, Uganda, June, 1915 (Brit.); *J. Claessens* 1448, Blukwa, Belgian Congo, August, 1921 (Bruss.); *idem* 1511, Goduma, Belgian Congo, Sept., 1921 (Bruss., 2 sheets); *R. Dümmer* 2641 p.p., alt. 1,200 meters, grassy hill slopes, "Kyalana" (Kyabana?), Uganda, November, 1915 (Kew); *idem* 2641*a*, eodem loco et tempore (Brit.); *R. L. Piemeisel & L. W. Kephart* 695, alt. 1,560 meters, Kylgegwa to Kampala, Uganda, November 11, 1927 (U.S.); *Elliot* 7520 (type, Brit.: cotype, Kew); *J. D. Snowden* 158, alt. 1,050 meters, Singo, Uganda, 1915 (Kew).

EXPLANATION OF PLATE CLIX

Bidens ugandensis: a, flowering and fruiting branch, ×0.63; *b*, cauline leaf, ×0.63; *c*, exterior involucral bract, ×5.03; *d*, interior involucral bract, ×5.03; *e*, ray corolla, ×3.77; *f*, palea, ×5.03; *g*, disc floret, ×5.03; *h*, *i*, achenes, ×5.03; *a*, *c*, *d*, *f*, *h*, from cotype, in Hb. Kew; *b*, *e*, *g*, from *Dümmer* 2641*a*, in Hb. Brit.; *i*, from *Brown* 2651, in Hb. Brit.

194. **Bidens cinerea** Sherff, Bot. Gaz. 59: 302. 1915. Pl. CLX.

Ligulae apice integrae vel vix denticulatae. . *B. cinerea* sensu stricto.

Ligulae apice plerumque profunde acriterque tridentatae.

var. *β. tricuspidata.*

Herba, verisimiliter perennis, erecta vel adscendenti-erecta, cinerea; caule striato, squarroso-hispido, subtetragono, monocephalico (vel ramis monocephalicis). Folia petiolata petiolis spinuloso-setosis 0.5–2 cm. longis, petiolo adjecto 2–6 cm. longa, tuberculato-scabrida et minute spinuloso-setosa, impari-pinnata, 1- vel 2-juga; foliolis ovatis vel cuneato-oblongis, dentatis vel lobulatis, dentibus (vel lobulis) acriter apiculatis. Capitula terminalia, pedunculata pedunculis 6–10 cm. longis, radiata, pansa ad anthesin ±2.5 cm. lata et circ. 5–7 mm. alta. Involucrum hispidum, bracteis duplici

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serie dispositis; exterioribus circ. 8, linearibus, 4–5 mm. longis; interioribus dimidio longioribus, lanceolatis. Flores ligulati flavi, ligula lineari-oblanceolati, apice integri vel parce denticulati, 7–9-striati, circ. 1.2 cm. longi. Achaenia linearia, obcompressa, atra, striata, adscendenti-hispida, corpore ±9 mm. longa, biaristata aristis retrorsum hamosis 2 mm. longis.

Type specimen: Collected by *C. S. Smith*, Kilimanjaro, German East Africa, May, 1893 (Kew).

Distribution: Known only from type locality, Kilimanjaro, German East Africa.

Specimens examined: *C. S. Smith*, Kilimanjaro, May, 1893 (type, Kew).

Bidens cinerea var. *β.* **tricuspidata** Sherff, Amer. Journ. Bot. 22: 705. 1935.

Caules sicci subbrunnei, graciliores. Foliorum petioli usque ad circ. 1 cm. longi. Capitula pansa ad anthesin demum 3 cm. lata, ligulis apice plerumque profunde acriterque tridentatis.

Type specimen: Collected by *Margarete Uhlig*, No. 2038, at altitude of about 2,000 meters, on wrinkled or folded lava rock, stream bed, North Meru, northeastern German East Africa, July 17, 1910 (Berl.).

Distribution: Known only from type locality in German East Africa.

Specimens examined: *Uhlig* 2038 (type, Berl.).

EXPLANATION OF PLATE CLX

Bidens cinerea: a, subfruiting specimen, ×0.73; *b*, exterior involucral bract, ×2.91; *c*, interior involucral bract, ×2.91; *d*, ray corolla, ×2.91; *e*, palea, ×2.91; *f*, disc floret, ×2.91; *g*, achene, ×2.91; all from type.

195. **Bidens crocea** Welw. ex O. Hoffm. Bol. Soc. Broteriana 10: 177. 1892. Pl. CLXI, figs. *a–g*.

Achaenia faciebus crebro spinuloso-verrucata . . . . . var. *β. verrucifera.*

Achaenia faciebus glabrata vel subglabrata . . . *B. crocea* sensu stricto.

Herbacea, perennis, elata, glaberrima, 6–12 dm. alta; caulibus (multis et procumbenti-adscendentibus ex Gossweilero) inferne simplicibus ac foliatis, superne in pedunculos circ. 3 longissimos et parce foliatos divisis. Folia petiolata petiolis 0.3–2.5 cm. longis, petiolo adjecto plerumque 3–7 cm. longa; caulina quam internodia

plerumque longiora, bipinnatipartita vel infima simpliciter pinnatipartita, rhachi segmentisque anguste linearibus, segmentis firmulis plerumque 1–2.5 cm. longis et 0.5–1.5 mm. latis acutis vel subacutis; folia pedunculorum remota, quam internodia multiplo breviora, simpliciter pinnatipartita, suprema brevia bracteiformia integerrimaque. Capitula solitaria, discoidea, ad anthesin circ. 1.5 cm. alta et 1–1.5 cm. lata. Involucri late campanulati bracteae exteriores circ. 8 vel 9, lineares, saepe acutae, 6–8 mm. longae; interiores lanceolatae vel oblongo-lanceolatae, coloratae, duplo-triplo longiores. Flores tubulosi crocei. Achaenia brunnea vel atro-brunnea, linearia, usque ad apicem truncatum non angustatumque aequilata, obcompressa, margine pilis aliis simplicibus aliis (perpaucis) uncinatis ciliata, apice corona minute ciliolata instructa, corpore circ. 11 mm. longa et 1.5 mm. lata, biaristata, aristis retrorsum hamosis, circ. 3 mm. longis.

Type specimen: Collected by *Friedrich Welwitsch*, No. 3964, in wooded meadows at altitude of 1,350–1,500 meters, around the great lake of Ivantâla, District of Huilla, Benguella (Benguela) region, Angola, end of February, 1860 (Berl.).

Distribution: Angola.

Specimens examined: *H. Baum* 696, alt. 1,250 meters, sporadic in sandy soil of light forest ("lichtem Wald"), Longa and Quiriri rivers, February 2, 1900 (Berl.; Brit.; Del.; Kew; Mun.; Mus. V.); *Dekindt* 861, in woods, Huilla, Benguella (Benguela) region (Berl.); *John Gossweiler* 3023, common in mumua woods, Tchirandongamba Luassingua, April, 1906 (Brit.); *idem* 3099, in mixed woods (composed chiefly, however, of mumua), at Luasenha-Cutchi, April 30, 1906 (Brit.); *idem* 3842, common in mumua woods at Kaconda, February 14, 1907 (Brit.); *idem* 4304, in open mumua woods between Kaconda and Bissapa, March 5, 1907 (Brit.); *Welwitsch* 3964 (type, Berl.: cotypes, Brit.; Cop.; Kew; Par.).

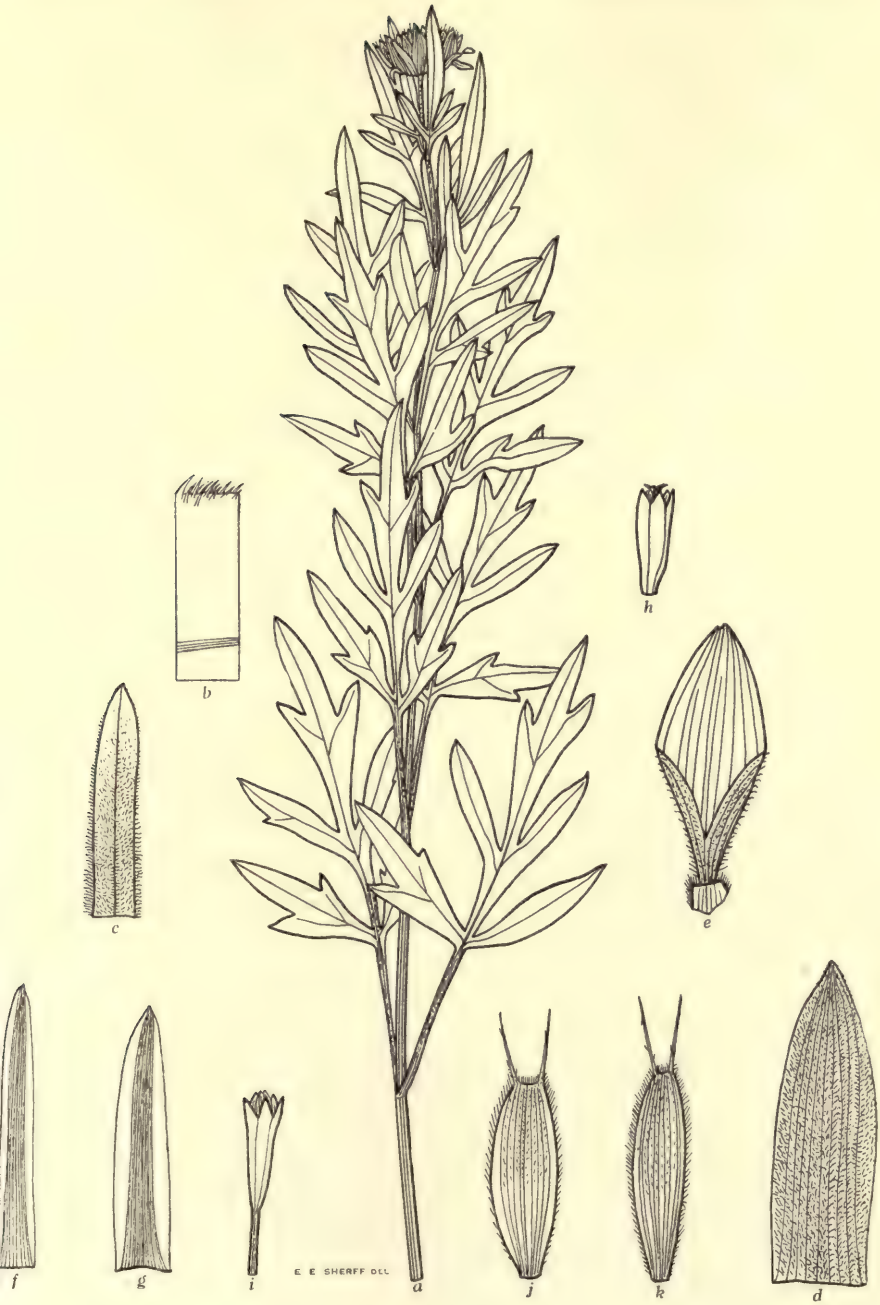
Bidens crocea var. *β.* **verrucifera** S. L. Moore, Journ. Linn. Soc. Bot. 37: 322. 1906. Pl. CLXI, fig. *h*.

A specie achaeniis crebro spinuloso-verrucatis, vel infra apicem faciebus vero glabris differt.

Type specimen: Collected by *John Gossweiler*, No. 1210, in thickets, Catombe near Malange, North Guanza District, Angola, May–August, 1903 (Brit.).

Distribution: Known only from type locality in Angola.

Specimens examined: *Gossweiler* 1210 (type, Brit.: cotype, Berl.).



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EXPLANATION OF PLATE CLXI

Bidens crocea, figs. *a–g*: *a* (lower), *b* (upper), portions of fruiting specimen, ×0.65; *c*, exterior involucral bract, ×2.6; *d*, interior involucral bract, ×2.6; *e*, palea, ×2.6; *f*, disc floret, ×2.6; *g*, achene, ×2.6; *a–e*, *g*, from type; *f*, from cotype, in Hb. Kew.

Bidens crocea var. *verrucifera*, fig. *h*: achene, ×2.6; from type.

196. **Bidens lineariloba** Oliver, Trans. Linn. Soc. 29: 99. *pl. 60*. 1873. Pl. LXVIII, figs. *g–o*.

Herba annua, erecta, interdum gracilis, glabrata, ramosa, 4-8 dm. alta, caule saepe valde costato. Folia subsessilia vel petiolata petiolis latis 4–1.5 cm. longis, petiolo adjecto 4–12 cm. longa, parce hispida, irregulariter bipinnata, totis segmentis nunc ad meras lineas tantummodo 0.5–1 mm. latas reductis, nunc 1–2 mm. latis; lobis ultimis paucis, acutissime indurato-apiculatis. Capitula corymbosa radiata, pansa ad anthesin 2–4.5 cm. lata et 7–12 mm. alta. Involucri bracteae exteriores 9–13, lineari-lanceolatae vel etiam anguste lineares, supra valde attenuatae, saltem basi ciliatae, apice acriter apiculatae, interioribus fere vel perfecte aequales, demum plus minusve reflexae, 6–11 mm. longae; interiores lanceolatae, glabratae. Flores ligulati 6–8, flavi, ligula elliptico-lanceolati, 10–14-striati, apice obscure vel perspicue denticulati, 0.7–2 cm. longi. Paleae lineari-lanceolatae vel lineares, acuminatae, interiores late ellipticae vel obovatae vel truncatae, supra longissime et perspicuissime lineari-productae, achaenia fere aequantes vel interdum etiam superantes. Achaenia plus minusve dimorpha; exteriora oblongo-linearia, basi moderatim angustata, faciebus marginibusque tuberculata et antrorsum spinoso-setosa, corpore 5.5–6.5 mm. longa et supra 2–2.5 mm. lata; interiora linearia, glabrata vel ad margines et supra ad facies sparsim setosa, corpore 8–10 mm. longa et 0.8–1.2 mm. lata; omnia valde obcompressa, sub apice conspicue biaristata; aristis demum valde divaricatis, inferne glabris, apicem versus retrorsum hamosis, 3–6 mm. longis.

Type specimen: Collected by *J. A. Grant*, No. 187, in cornfields, Mininga (Mininja), German East Africa, April, 1861 (Kew).[1]

Distribution: Ukerewe Island in Lake Victoria Nyanza (Lake Ukerewe) and southeastward through the northern part of German East Africa.

[1] Oliver (loc. cit.) accredits the type to Grant alone, but the type label says: "Coll. by *Capts. Speke & Grant.*"

Specimens examined: *Braun* 5372, Lulangula, Distr. Tabora, German East Africa, May 29, 1913 (Berl.); *P. Conrads* 34, Ukerewe Isl., Lake Victoria Nyanza, German East Africa, 1903 (Berl., 2 sheets); *Durham*, Tanganyika Central Railway, at Kikombo, German East Africa (Kew); *Grant* 187 (type, Kew); *Grote* 3749, Monga-Mongatour, east equatorial Africa, March, 1912 (Berl.); *J. Hannington*, Msilala (Msalala), German East Africa, communic. 1883 (Kew); *F. L. Stuhlmann* (*Exped. Emin Pascha*) 225, northern German East Africa (Berl.); *C. F. M. Swynnerton* 845, German East Africa, June 5, 1921 (Brit.); *Uhlig* 118, field near Kagunguli, Ukerewe Isl., Lake Victoria Nyanza, German East Africa, April 29, 1904 (Berl.).

Easily distinguished from all other species of *Bidens* by the numerous acute, finally spreading exterior involucral bracts and the peculiar inner paleae, which are membranous-winged below and with greatly extended, exalate apex running upwardly and surpassing the bodies of the achenes. My description of the mature achenes is drawn from the mature specimen, *Braun* 5372 (Berl.), collected at a spot (Lulangula) close to the type locality of Mininga. The achenes simulate those of certain Hawaiian species in having the aristae attached somewhat below rather than at the top of the achene body.

EXPLANATION OF PLATE LXVIII, FIGS. *g–o*

Bidens lineariloba: g, flowering and subfruiting specimen, ×0.68; *h*, exterior involucral bract, ×2.72; *i*, interior involucral bract, ×2.72; *j*, ray corolla, ×2.04; *k*, palea, ×2.72; *l*, palea, ×2.72; *m*, disc floret, ×2.72; *n* (outer), *o* (inner), achenes, ×2.72; all from *J. Hannington*, Msilala, German East Africa, communic. 1883, in Hb. Kew.

197. **Bidens flabellata** O. Hoffm. in H. Baum, Kunene-Sambesi Exped. 419, *pl. 11*, *G*. 1903. Pl. CLXII.

Herbacea, perennis; caulibus multis (fide Gossweileri), procumbentibus flexuosisque vel adscendentibus, subteretibus, pilis septatis puberulis, simplicibus vel parce ramosis, 3–10 dm. longis, ad 3–4 dm. surgentibus (ex Baumio). Folia petiolata petiolis 0.4–2.5 cm. longis et supra saepe dilatato-marginatis, petiolo adjecto 2–6.5 cm. longa, coriacea, orbicularia vel flabellata, ciliata et (venis praecipue) hispidula, subtus pallida, supra petiolum rotundata vel sinuato-cuneata, praeter basim grosse crenata vel flabellatim multilobata, segmentis dentibusve acute calloso-apiculatis. Capitula ad apicem caulis ramive solitaria, longiuscule vel longe pedunculata pedunculis 6–25 cm. longis, radiata, pansa ad anthesin 4–5 cm. lata et 1.4–2

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cm. alta. Involucrum basi pilosum; bracteis exterioribus circ. 8, brevibus (circ. 3.5 mm. longis), oblongis vel lineari-lanceolatis, ciliatis, dorso saepe sparsim hispidis, apice obtusis vel subacutis et induratis; interioribus lanceolatis, 10–12 mm. longis. Flores ligulati circ. 8, lutei, ligula anguste oblongo-elliptici, apice obtuso subintegri vel tridentati, 1.5–2.5 cm. longi. Achaenia linearia, obcompresso-tetragona vel plana, marginibus ac costis medianis suberecte ciliata alibi glabra, omnino circ. 16-sulcata, fusca vel nigrescentia, corpore exteriora ±9 mm. longa et interiora ±16 mm. longa, omnia biaristata; aristis tenuibus, retrorsum hamosis, 3.5–5 mm. longis.

Type specimen: Collected by *H. Baum* (Kunene-Sambesi Expedition), No. 847, in sandy, clay soil among bushes at altitude of 1,350 meters, Manonge on the Kuebe River, Mambunda region, southeastern Angola, April 22, 1900 (Berl.).

Distribution: Western Africa from Angola southward.

Specimens examined: *Baum* 847 (type, Berl.: cotypes, Brit.; Del.; Kew; Mus. V.); *John Gossweiler* 2635, Angola, April 16, 1906 (Brit.).

EXPLANATION OF PLATE CLXII

Bidens flabellata: a–c, portions of subfruiting specimens, ×0.63; *d,* exterior involucral bract, ×4.4; *e,* interior involucral bract, ×2.52; *f,* ray corolla, ×2.52; *g,* palea, ×2.52; *h,* disc floret, ×2.52; *i,* achene, ×2.52; all from *Gossweiler* 2635, in Hb. Brit.

198. **Bidens Baumii** (O. Hoffm.) Sherff, Bot. Gaz. 59: 309. 1915. Pl. CLXIII.

Coreopsis Baumii O. Hoffm. in H. Baum, Kunene-Sambesi Exped. 419. 1903.

Herbacea, perennis, elata, simplex vel parce ramosa, 1–1.3 m. alta; caule tetragono, glabro. Folia principalia sensim in petiolum 2–3 cm. longum angustata et non vere sessilia, petiolo adjecto 6–11 cm. longa, membranacea, indivisa, lanceolata vel ovato-lanceolata, apice acuta vel parce acuminata, grosse serrato-dentata dentibus calloso-attenuatis, hispidulo-ciliata, glabra vel infra paucis setis adpressis sparsissime vestita, minute glanduloso-punctata. Capitula radiata, pansa ad anthesin 3.5–5 cm. lata, solitaria vel perpauca, longe tenuiterque pedunculata; pedunculis glabris, usque ad 16 cm. (vel ultra) longis, parce bracteatis. Involucrum basi hispidum, bracteis exterioribus circ. 8, linearibus, saepe hic illic aciculato-ciliatis, apice callosis, circ. 6–7 mm. longis; interioribus lineari-

lanceolatis, circ. 9–11 mm. longis. Flores ligulati 6–8, aurei, ligula oblongo-lanceolati ellipticive, apice subintegri, 2–3.2 cm. longi. Achaenia exteriora late interiora anguste linearia, omnia obcompressa, adpresse pilosa, adscendenti-ciliata, omnino circ. 16-sulcata, atra, 6–9 mm. longa et 1–1.7 mm. lata, quam paleae manifeste breviora, apice adrecte setosa et exaristata vel saepe aristis 2 brevibus subulatis superne nudis et usque ad 1 mm. longis coronata.

Type specimen: Collected by *H. Baum*, No. 883, sporadic on sandy loam in dense forest at altitude of 1,300 meters, between Kuma and Kutsi, Mambunda region, southeastern Angola, May 2,[1] 1900 (Berl.).

Distribution: Angola.

Specimens examined: *Baum* 883 (type, Berl.: cotype, Brit.; Kew); *John Gossweiler* 3147, in open, herb-grown woods between Lambo River and Cutchi, May 1, 1906 (Brit.; Kew).

EXPLANATION OF PLATE CLXIII

Bidens Baumii: a (lower), *b* (median), *c* (uppermost), portions of flowering specimen, ×0.63; *d*, portion of leaf enlarged to show ciliation and glandular-punctate surface, ×3.13; *e*, exterior involucral bract, ×3.13; *f*, interior involucral bract, ×3.13; *g*, ray corolla, ×1.88; *h*, *i*, paleae, ×3.13; *j*, disc floret, ×3.13; *k*, achene, ×3.13; *a–g*, *j*, from cotype, in Hb. Kew; *h*, *i*, *k*, from *Gossweiler* 3147, in Hb. Brit.

199. **Bidens ruandensis** Sherff, Bull. Jard. Bot. Brux. 13: 285. 1935.

Herba, sine dubio perennis, erecta, ±7 dm. alta; caule subsimplici, plus minusve tetragono, moderate hispido. Folia principalia petiolata petiolis tenuibus aegre hispidis anguste marginatis circ. 2–3 cm. longis, petiolo adjecto 7–11 cm. longa et ±1.5 cm. lata, indivisa, rhomboide oblongo-lanceolata, utroque latere acriter circ. 3- vel 4-dentata dentibus saepius incurvis, basi cuneata apice plus minusve acuminata, supra moderate infra secundum venas perspicue alibi sparsim hispida; superiora linearia, usque ad 1 dm. longa et 5–6 mm. lata. Capitula perpauca (±3), pedunculata pedunculis tetragonis patenti-hispidis ±6 cm. longis, radiata, pansa ad anthesin ±5 cm. lata et ±1.2 cm. alta. Involucri basi valde supra moderate hispidi bracteae 2–3-seriales; extimae circ. 10, oblonge lineares, elongatae, supra acerrimae ac crassiusculo-induratae inter-

[1] Not December 2, as erroneously printed in Hoffmann, loc. cit.

dum nitidae, 1–1.3 cm. longae, quam aliae longiores. Flores ligulati circ. 11 vel 12, flavi, ligula oblongo-lineares, apice minutissime 2–3-denticulati, circ. 2.2–2.5 cm. longi. Flores tubulosi sub medio sparsim patenti-hispidi. Ovaria plana, oblonga, exalata, faciebus pluristriata aliter glabrata, marginibus apiceque dense erecto-setosa, biaristata; aristis tenuibus, acerrimis, nudis vel basim versus sparsim erecto-hispidis, 1–2 mm. longis.

Type specimen: Collected by *H. Scaetta*, No. 427, Ruhengeri, Ruanda, northwestern German East Africa (Bruss.).

Distribution: Ruanda, northwestern German East Africa.

Specimens examined: *Scaetta* 427 (type, Bruss.).

200. **Bidens Moorei** Sherff, Bot. Gaz. 81: 25, *pl. 1, figs. a–g.* 1926. Pl. CLXIV, figs. *a–g.*

Achaenia 2- (saepe imperfecte 3- vel 4-) aristata, faciebus erecte hispida..... *B. Moorei* sensu stricto.

Achaenia plerumque 6–8-aristata, faciebus verrucata. var. *β. verrucosa.*

Herba perennis, glabra, 3–5 dm. alta, caule adscendenti et ramoso; ramis plus minusve glaucescentibus, monocephalicis, gracilibus, supra nudis, infra foliis parvulis foliosis. Folia sessilia, lanceolata vel cuneato-oblanceolata, integra vel apicem versus irregulariter dentata, carnosa, 1–6 cm. longa. Capitula terminalia, longe pedunculata, radiata, 4–5 cm. lata. Involucri squamae duplici serie dispositae; exteriores circ. 8, ovatae vel ovato-lanceolatae, 6–8 mm. longae; interiores lanceolatae, membranaceae, striatae, 1.2–1.4 cm. longae. Flores ligulati circ. 8, flavidi, ligula lineares, striati, apice dentati, 2–2.6 cm. longi. Achaenia linearia, plana vel subtetragona, adscendenti-ciliata et -hispida, corpore 0.8–1.5 cm. longa et 1–1.2 mm. lata, bi- (saepe imperfecte tri- vel quadri-) aristata aristis retrorsum hamosis, usque ad 5 mm. longis.

Type specimen: Collected by *John Gossweiler*, No. 3339, in woods, Angola, April, 1906 (Brit.).

Distribution: Angola.

Specimens examined: *H. Baum* (*Reise nach Südwest-Africa: Kunene-Sambesi Expedition*) 708, alt. 1,250 meters, Longa River ("oberhalb des Quiriri," "oberhalb Ninnescra"), Cubango Distr., February 5, 1900 (Berl.; Brit.; Del.; Kew; Mus. V.); *John Gossweiler* 2467, sandy, herb-grown woods, Angola, January 5, 1906 (Brit.); *idem* 3339 (type, Brit.).

Otto Hoffmann, in his original determination of Baum's plant, treated it as a new species. Whether he did so because at that time he was unfamiliar with *Bidens andongensis* Hiern, or because, although familiar with Hiern's species, he felt Baum's plant to be distinct, I am unable to say. However, he later (Kunene-Sambesi Exped. 420. 1903) referred the Baum specimen to *B. andongensis* Hiern. Since the main differences lay in the size and shape of the involucres, also the number and shape and proportionate size of the exterior involucral bracts, one might indeed have suspected that Baum had collected merely an atypic and less robust form of *B. andongensis*. The various specimens sent in more recently by Gossweiler to the British Museum of Natural History show similar peculiarities as to these characters, thus strengthening the belief that we have to do with a distinct species.

The species was named in honor of the late Spencer L. Moore of the British Museum of Natural History, who had done much admirable work upon the African species of *Bidens*, and who, independently, had interpreted the Gossweiler plants as typifying a new species.

Bidens Moorei var. *β.* **verrucosa** Sherff, op. cit. 26, *pl. 1, figs. h, i.* Pl. CLXIV, figs. *h* and *i*.

A specie differt achaeniis verrucatis; his plerumque 5–8-aristatis, saepe praeterea 4–10 levibus acutis aristulis coronatis.

Type specimen: Collected by *John Gossweiler*, No. 3021, Angola, April, 1906 (Brit.).

Distribution: Angola.

Specimens examined: *Gossweiler* 3021 (type, Brit.).

A form so peculiar in fruit characters that it is perhaps best treated for the present as a variety. Various considerations indicate no basis for regarding it as a separate species. The achenes are minutely warty and 5–8-aristate (commonly with 3 long aristae and 2–5 short ones, with frequently 4–10 additional rudimentary, smooth, sharp aristae completing a crown). The variety is seen to be comparable, in its relation to the species proper, with the var. *verrucifera* Moore of *Bidens crocea* Welw. In its large number of aristae it makes a singular approach to *Ericentrodea mirabilis* (Sherff) Blake & Sherff, a plant that differs widely in other respects.

EXPLANATION OF PLATE CLXIV

Bidens Moorei, figs. *a–g*: *a*, flowering and fruiting specimen, ×0.63; *b*, exterior involucral bract, ×1.26; *c*, interior involucral

bract, ×2.52; *d*, ray corolla, ×1.26; *e*, palea, ×2.52; *f*, disc floret, ×2.52; *g*, achene, ×2.52; all from type.

Bidens Moorei var. *verrucosa*, figs. *h*, *i:* achenes, ×2.52; both from type.

201. **Bidens andongensis** Hiern, Cat. Welw. Afr. Pl. 1: 588. 1898. Pl. CLXV.

Herba erecta, glabra vel subglabra, perennis, basi lignea; caule inferne simplici, superne subramoso, subtereti. Folia sessilia vel inferiora petiolata petiolis alatis usque ad 2 cm. longis, petiolo adjecto 2–7.5 cm. longa et 1–4.5 cm. lata, indivisa vel parce lobulata, elliptica vel ovata vel rhomboideo-oblanceolata, apice acuta vel subobtusa, basi plerumque cuneato-angustata, grosse et inaequaliter dentata, subcarnosa, minute punctulato-squamosa. Capitula solitaria, terminalia, pedunculata pedunculis 5–10 (–19) cm. longis, radiata, pansa ad anthesin circ. 5 cm. lata et 1.2–1.6 cm. alta. Involucri bracteae subbiseriatae, lanceolato-oblongae, subacutae vel subobtusae, exteriores 10–14 circ. 8–10 mm. longae et 1.5–3 mm. latae, interiores circ. 11–13 mm. longae et 3–5 mm. latae. Flores ligulati circ. 8–12, aurei, ligula anguste elliptici vel lineari-oblongi, feminei vel pauci hermaphroditi sed probabiliter steriles, apice acuti, circ. 1.8–2.2 cm. longi. Achaenia immatura lineari-oblonga, plana, marginibus ciliata, corpore 4.5 mm. longa et 1.2 mm. lata, apice erecte setulosa et biaristata; aristis de apice usque ad basim dense et retrorsum hamosis, circ. 3.5 mm. longis.

Type specimen: Collected by *Friedrich Welwitsch*, No. 3529, in sandy, bushy places at altitude of 720 to 1,140 meters, near Quibinde (Quibinda), not far from the Cuije River, District of Pungo Andongo (Loanda District), Angola, March, 1857 (Brit.).[1]

Distribution: Angola.

Specimens examined: *John Gossweiler* 3631, in short, thicket-grown pasturage, Valley of Cubal, near Cubal River, Distr. Benguella (Benguela), March-August, 1907 (Brit.); *Welwitsch* 3529 (type fragment and drawing, Brit.).

In an earlier article (Bot. Gaz. 59: 312. 1915) I have stated that Gossweiler's 3631 may properly be taken as representative of this species. In many respects both Gossweiler's plant and Hiern's type material appear to be too close to *Bidens Buchneri* (Klatt) Sherff, a

[1] The type sheet bears a crude sketch and a fragment of the type specimen, the major portion having been returned to Lisbon on demand of the Portuguese Government (cf. Hiern, loc. cit.).

species likewise from Angola. The latter species, however, has the achenial aristae only sparsely barbed and the few barbs near the base are erect, not retrorse; furthermore, the rays (15–18) are more numerous than in *B. andongensis* and none of the leaves, so far as I know, are ever as narrowly petiolate as in some cases with *B. andongensis*.

EXPLANATION OF PLATE CLXV

Bidens andongensis: a (lower), *b* (upper), portions of one flowering specimen, 0.67; *c*, upper portion of another flowering specimen, ×0.67; *d*, exterior involucral bract, ×1.34; *e*, interior involucral bract, ×2.68; *f*, ray floret, ×1.34; *g*, palea, ×2.68; *h*, disc floret, ×2.68; all from *Gossweiler* 3631, in Hb. Brit.

202. **Bidens Buchneri** (Klatt) Sherff, Bot. Gaz. 76: 158. 1923. Pl. CLXVI.

Coreopsis Buchneri Klatt, Leopoldina 25: 107. 1889 (non Ann. Naturh. Hofmus. Wien 7: 103. 1892).

Herba erecta, perennis (non "annua"), 6–10 dm. alta; caule obtuse tetragono, glabro, superne ramoso. Folia sessilia vel breviter alato-petiolata petiolis circ. 3–5 mm. longis, petiolo adjecto principalia 10–13 cm. longa et 3.5–4.5 cm. lata, membranacea vel parce subcoriacea, indivisa, late oblongo-lanceolata, basi saepe subaurita, margine duplicato-serrata dentibus apice cartilagineis et brevissime setoso-ciliata, apice non vere acuminata, utrinque dense sed non perspicue verrucoso-scabra, aliter glabra. Capitula terminalia, plerumque solitaria, pedunculata pedunculis superne breviter hirtopilosis et 10–18 cm. longis, radiata, pansa ad anthesin circ. 6.5–8.5 cm. lata et 1.2–1.8 cm. alta. Involucri bracteae exteriores pluriseriatae, totae ±16, lanceolatae vel ovato-lanceolatae, subacutae, moderate brevi-hispidae vel subglabrae, inconspicue rugoso-marginatae vel spinuloso-ciliatae, 1.7–2.2 cm. longae et 5–8 mm. latae; interiores breviores, 1–1.3 cm. longae. Flores ligulati 15–18, aurantiaci, lineari-elliptici, apice acuti vel minute denticulati, 3–4 cm. longi. Achaenia immatura plana, lineari-oblonga, margine et apice et superne faciebus dense setulosa, corpore circ. 4 mm. longa et 1 mm. lata, biaristata; aristis tenuibus apicem versus retrorsum 1- vel 2-hamosis et basim versus erecte 1–3-setulosis, 2–3 mm. longis.

Type specimen: Collected by *Wilhelm Buchner*, No. 31, Malange, Angola, March, 1879 (Berl.).

Distribution: Known only from type locality in Angola.

Specimens examined: *Wilhelm Buchner* 31 (type, Berl.).

Klatt (loc. cit.) described the achenial aristae as glabrous, but a study of ten immature achenes removed from the one large flowering head on the type sheet shows all the aristae to be downwardly barbed near the apex and upwardly barbed near the base. The inner bracts of the involucre, which are shorter than the outer, the more numerous rays, and the peculiarly barbed aristae appear to distinguish this species sufficiently from *B. andongensis* Hiern.

We may note that in a second publication (Ann. Naturh. Hofmus. Wien 7: 103. 1892) Klatt repeated his description of this species with only slight changes but cited Von Mechow's No. 394 instead of the Buchner plant. However, *Von Mechow* 394 does not represent *B. Buchneri* and must be discarded.[1]

EXPLANATION OF PLATE CLXVI

Bidens Buchneri: a (lower), *b* (upper), portions of flowering specimen, ×0.56; *c*, exterior involucral bract, ×2.25; *d*, interior involucral bract, ×2.25; *e*, ray corolla, ×1.69; *f*, palea, ×2.25; *g*, disc floret, ×3.37; *h*, ovary, ×3.37; all from type.

203. **Bidens somaliensis** Sherff, Bot. Gaz. 90: 395. 1930. Pl. CLXVII.

Herba perennis, erecta, supra erecte ramosa, verisimiliter circ. 9–12 dm. alta, caule glabrato tetragono. Folia non manifeste petiolata, 8–14 cm. longa et 1.2–3.3 cm. lata, lanceolata vel plus minusve spathulato-lanceolata, inferne sensim ad basim parce connatam angustata, apice acuta sed non acuminata, acriter serrata plerumque 4–9 dentibus unico latere, subrigida, supra breviter hispida vel glabrata infra dense hispida. Capitula pedunculata pedunculis bracteatis inferne debiliter superne valde hispidis circ. 1–1.6 cm. longis, radiata, pansa ad anthesin 4–6.5 cm. lata et 1.2–1.5 cm. alta. Involucri bracteae plus minusve biseriales, exteriores circ. 10–12, lanceolatae vel ovato-oblongae, apice subacutae et induratae, marginibus ac saepe faciebus pilis albis articulatis hispidae, circ. 0.9–1.2 cm. longae, pro capitulo juniore disco subaequales; interiores oblongo-ovatae plus minusve hispidae, saepius paulo longiores. Flores radiati 8–14, flavi, ligula subanguste ovato-oblongi, apice minutissime denticulati. Paleae late lineari-oblongae, subrigidae, valde paucistriatae, supra saepe hispidae atque abrupte vel sensim angustatae, demum achaeniorum corpora paulo superantes. Achaenia cuneato-oblanceolata, plana, brunneo-nigra, faciebus spar-

[1] See discussion under *Bidens grandis* Sherff.

sim marginibus atque apice dense erecto-setosa, utraque facie nunc circ. 8- nunc circ. 16-sulcata, corpore 1–1.4 cm. longa et 3–4.5 mm. lata, biaristata; aristis acribus, brunneo-stramineis, infra medium subsparsim antrorsumque setosis, supra medium plerumque nudis.

Type specimen: Collected by *Domenico Riva*, No. 85 (field No. 1306; *Expedition of Eugenio Ruspoli*), in grassy fields and on plains, from Biddum to Volghe, Somalia, September 15, 1893 (Flor., 2 sheets).

Distribution: Somalia.

Specimens examined: *Riva* 85 (Flor., 2 type sheets).

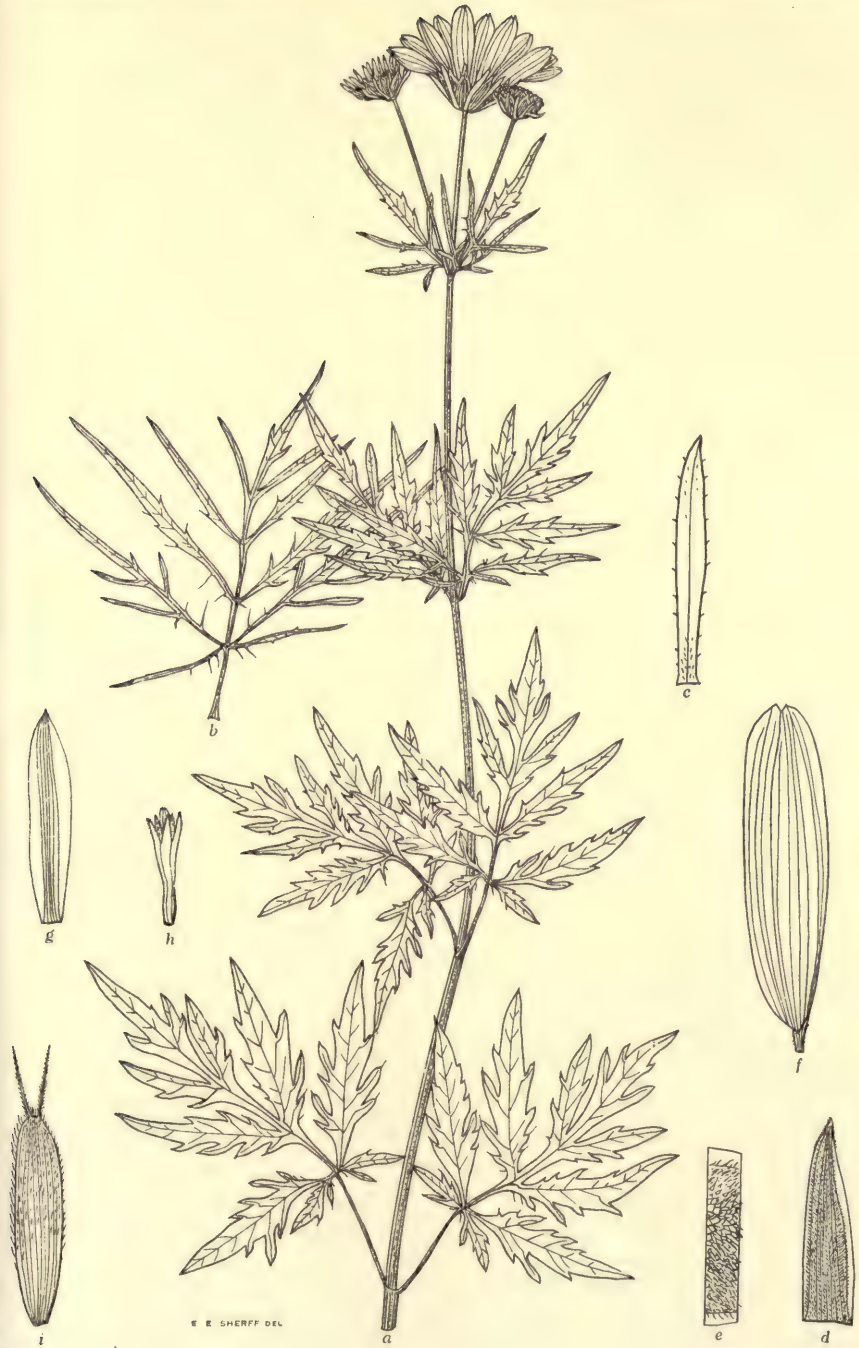
EXPLANATION OF PLATE CLXVII

Bidens somaliensis: a, flowering specimen (stem subtetragonal, but this not showing well in sketch), ×0.56; *b*, exterior involucral bract, ×3.37; *c*, interior involucral bract, ×3.37; *d*, ray corolla, ×1.69; *e*, palea, ×3.37; *f*, disc floret, ×4.5; *g*, achene, ×3.37; all from 2 type sheets.

204. **Bidens Seretii** (DeWild.) Sherff, Bot. Gaz. 76: 162. *pl. 14.* 1923. Pl. CLXVIII.

Coreopsis Seretii DeWild. Ann. Mus. Congo V. 2: 212. 1907.

Herba perennis, erecta, 0.9–1.5 m. alta, habitu *Heliantho* simillima; caule subtereti vel aegre quadrangulari, glabrescenti vel setulis brevissimis hispidulo, non nisi ad apicem ramoso. Folia sessilia, 6–13 cm. longa et 1.5–3 cm. lata, indivisa, lanceolata vel lanceolato-oblonga, rigidula, serrata dentibus calloso-apiculatis, supra rugulosa et glabrata vel scabrido-hispida, infra pallidiora et scabrido-hispida, margine ciliata, apice acuminata, basi inferiora ac mediana saepius sensim summa plerumque abrupte angustata, mediana (interdum) summa (saepe) etiam subamplexicaulia. Capitula non numerosa, corymbosa, magna, radiata, pansa ad anthesin 5–8 cm. lata et 1.4–1.8 cm. alta, pedunculata pedunculis tomentoso-hispidis, ±3.5 cm. longis. Involucrum scabrido-hispidum, bracteis imperfecte 4-serialibus, ad apicem saepius reflexis; exterioribus circ. 12 (6+6), subfoliaceis, late lineari-oblongis vel interdum late oblongo-lanceolatis, supra attenuatis, apice acutis, circ. 1.3–1.7 (rarius –3) cm. longis, in capitulo juniore discum facile superantibus; bracteis interioribus late linearibus vel etiam lanceolatis, superne attenuatis, quam exterioribus manifeste brevioribus. Flores ligulati 10–14, flavi, ligula oblanceolati vel elliptico-oblongi, 12–16 striis percursi, tubi apice pilosi, ad summam integri vel interdum lobulati, 2.5–4.5



BIDENS CHAETODONTA Sherff (figs. *a*, *c–i*); var. GLABRIOR (O. & H. *in* Oliv.) Sherff (fig. *b*)

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cm. longi et 0.6–1.5 cm. lati; ovario sterili oblongo vel subcuneato, plano, marginibus et apicem versus adrecte setoso, 2–3 mm. longo. Achaenia matura lineari-oblonga vel subcuneata, plana, subatra, striata, marginibus et apice adrecte setosa, faciebus non nisi supra setosa, corpore 5–10 mm. longa et 1.4–2 mm. lata, biaristata; aristis tenuibus, suberectis, infra saepe 1–3 setis acriter adrecteque munitis, supra calvis vel interdum apicem versus 1 vel 2 setis retrorsum hamosis, 1.5–2.5 mm. longis.

Type Specimen: Collected by *F. Seret*, No. 306, at summit of Mt. Angba, on right bank of Uele River, Belgian Congo, November 9, 1905 (Bruss., 2 sheets).

Distribution: Belgian Congo and adjacent Uganda of British East Africa.

Specimens examined: *Miss G. E. Benham*, Mt. Elgon, Uganda, British East Africa, 1920 (Brit.); *Joseph Bequaert* 3040, on grassy savanna, Irumu, Belgian Congo, March 14, 1914 (Bruss., 2 sheets); *M. T. Dawe* 415, alt. 1,500 meters, Ankoa, Uganda, 1905 (Kew); *R. Dümmer* 313, alt. 1,200 meters, swamp, Uganda, October, 1913 (Brit.); *idem* 492, alt. 1,200 meters, dry, grassy slope, Namaiba Hill, Uganda, October 15, 1913 (Brit.; Par.); *idem* 493, eodem loco, November–December, 1913 (Kew); *R. Fyffe* 235, Entebbe, Uganda (Kew); *T. D. Maitland* 236, common on hillsides in grassland, Kampala, Uganda, October, 1922 (Kew; nom. vulg., Kymyula); *idem* 634*B*, Uganda (Kew); *Nannan* 601, near villages and in old clearings, alt. 800 meters, Kokuma, Terr. Wamba, Distr. Ituri, Belgian Congo, June 23, 1923 (Bruss.); *Seret* 306 (type, Bruss., 2 sheets); *C. B. Ussher* 1, Mabira Forest, Chagwe, Uganda, October, 1906 (Kew).

There are two ample specimens of the type. Their achenes are wingless and the aristae lack barbs. A specimen from Uganda (*Dawe* 415) has, however, many of the aristae retrorsely barbed at the apex. This last specimen I had described in manuscript as a new species, but later found it specifically identical with the type specimens of *Coreopsis Seretii*. It may be remarked that, had De-Wildeman relied upon the more significant presence or absence of achenial wings instead of the presence or absence of retrorse aristal barbs (cf. Sherff, Bot. Gaz. 59: 308. 1915), he would have had no hesitation in placing the species in *Bidens* at the outset.

EXPLANATION OF PLATE CLXVIII

Bidens Seretii: a, flowering specimen, ×0.55; *b*, portion of lower surface of leaf, ×2.2; *c*, exterior involucral bract, ×1.65; *d*, interior

involucral bract, ×1.65; *e*, ray floret, ×1.1; *f*, palea, ×1.65; *g*, disc floret, ×1.65; *h*, achene, ×3.31; all from *Dawe* 415, in Hb. Brit.

205. **Bidens Stuhlmannii** (O. Hoffm.) Sherff, Bot.Gaz. 76: 158. 1923. Pl. CLXIX.

Coreopsis Stuhlmannii O. Hoffm. in Engler, Pflanzenw. Ost-Afr. C. 415. 1895.

Herba perennis, usque ad 1.5 m. alta, ramis saepe tetragonis nunc glabratis nunc glanduloso-pubescentibus vel superne tomentosis. Folia sessilia vel subsessilia, indivisa, nunc late oblongo-lanceolata, nunc anguste oblonga vel elliptica, apice acuta, basi late cuneata vel rotundato-truncata et in petiolum brevissimum alatum subito contracta, margine grosse serrata et minute ciliata, supra parce subter dense glanduloso-pilosa, usque ad 11 cm. longa. Capitula ad apices ramorum plerumque solitaria, radiata, pansa ad anthesin 5–7 cm. lata et circ. 1.5 cm. alta. Involucri bracteae circ. 4-seriatae, subaequilongae, ab 7–12 exterioribus ovato-lanceolatis vel oblongis herbaceis undique tomentosis ad interiores angustiores membranaceas multo minus pubescentes sensim vel abrupte transeuntes, 1.2–1.8 cm. longae. Flores ligulati 9–12, flavi, ligula late elliptici vel oblanceolati, circ. 2.5–3 cm. longi. Achaenia plana, demum lineari-oblonga et atra, utraque facie circ. 8-striata, exalata, margine apiceque erecto-setosa, corpore 6–7.5 mm. longa et circ. 1.5 mm. lata, biaristata, aristis tenuibus, nudis vel rarius 1–3 spinulis ad basim antrorsum hamosis, usque ad 2 mm. longis.

Type specimen: Collected by *Franz Ludwig Stuhlmann*, No. 1649, at altitude of 1,550 meters, Kitungu (Karagwe), German East Africa, February 19, 1890 (Berl.).[1]

Distribution: Uganda Protectorate of British East Africa, southward to the west of Lake Victoria Nyanza (Lake Ukerewe), thence southeastward to east central German East Africa.

Specimens examined: *Von Prittwitz und Gaffron* 293, Meia-Kampi-ndizi road, east central German East Africa, May 16, 1901 (Berl.; Hamb.); *Stuhlmann* 1649 (type, Berl.).

EXPLANATION OF PLATE CLXIX

Bidens Stuhlmannii: a, flowering and fruiting branch, ×0.61; *b*, separate leaf, ×0.61; *c*, portion of leaf enlarged to show pubescence,

[1] The Stuhlmann plant is taken as the type. Hoffmann cited a specimen by Meyer first, but this was a mere scrap, utterly worthless for determination. The fairly large and much better specimen by Stuhlmann, though cited after Meyer's, was clearly the type from which Hoffmann's description was drawn.

BIDENS RUEPPELLII (Schz. Bip.) Sherff

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×2.44; *d*, exterior involucral bract, ×2.44; *e*, interior involucral bract, ×2.44; *f*, ray floret, ×2.44; *g*, palea, ×2.44; *h*, disc floret, ×2.44; *i*, *j*, achenes, ×3.66; *a*, *j*, from *Prittwitz-Gaffron* 293, in Hb. Berl.; rest from type.

206. **Bidens grandis** Sherff, Bot. Gaz. 59: 309. 1915. Pl. CLXXI.

Coreopsis lineata Klatt, Ann. Naturh. Hofmus. Wien 7: 103. 1892.

Coreopsis speciosa Hiern, Cat. Welw. Pl. 1, part 3: 585. 1898.

Herba robusta, erecta, annua vel biennis forsan saepius perennis, apicem versus ramosa, 1–2.2 m. alta; caule inferne glabrato, plus minusve quadrangulato, ramis erecto-patentibus apicem versus breviter hispidulis. Folia subsessilia vel petiolata petiolis usque ad 2.5 cm. longis (totum folium 4–13 cm. vel ultra longum), coriacea vel parce submembranacea, glabrata vel utrinque breviter strigosa, ciliata, ad margines plus minusve cartilaginea et anguste revoluta, nunc indivisa et ovata vel raro lanceolata, nunc tripartita lobis ovatis vel terminali interdum oblongo-lanceolato et multo longiore; lamina foliolisve ad apicem obtusis vel interdum etiam acutis, ad margines grosse et inaequaliter dentatis dentibus acute indurato-apiculatis. Capitula magna, plerumque singulatim caulim ramosque terminantia, erecta, radiata, pansa ad anthesin 5–10 cm. lata, pedunculata; pedunculis 5–15 cm. longis, nudis vel foliatis, subrobustis. Involucrum setis brevibus crassis spinulosisque vestitum, supra 2–4.5 cm. latum, bracteis biseriatis vel subtriseriatis; exterioribus 9–12, foliaceis, subcarnosis, aciculato-ciliatis, apice obtusis vel subacutis, nunc linearibus vel angustissime lineari-lanceolatis 1.6–2.3 cm. longis et interiores ovato-lanceolatas dimidio superantibus, nunc (rarius) ovato-rotundatis tantum circ. 4 mm. longis et quam interioribus ovatis vel ovato-lanceolatis dimidio brevioribus. Flores ligulati numerosi, 10–18, aurei, ligula elongata lineari-elliptici vel interdum oblanceolati, apice acuto integri vel dentati, 2.5–3.8 cm. longi. Achaenia lineari-oblonga vel cuneato-linearia, obcompressa vel plana, omnino circ. 16-sulcata, nigra, marginibus antrorsum setuloso-ciliata, corpore circ. 1 cm. longa, apice subemarginato dense adrecteque setulosa ac biaristata; aristis subulatis erecto-patentibus, supra calvis, infra adrecte setulosis, 2–3 mm. longis.

Type specimen: *Friedrich Welwitsch*, No. 3537, by thickets from N-gombe in the direction of Puri-Cacarambola, Ambaca, Angola, October, 1856 (Brit.) is the first cited specimen. The original description was based also upon Welwitsch's 3535, 3536, and 3538, all from Pungo Andongo, in the same vicinity.

Distribution: Tropical Africa; chiefly in Angola, but also in the widely separated Usambara (northeastern German East Africa) and Sidamo (southern Abyssinia) regions at the east of the continent.

Specimens examined: *John Gossweiler*, alt. 1,300 meters, near Sucala (Lucalla) River at Gala Suije, Malange Region, Angola, June, 1925 (U.S.); *idem* 1224, common between Lucalla (Sucala) and Catembe on road to Malange (Malanji), Angola, May 5, 1903 (Berl.; Kew); *idem* 1227, District of Malange (Malanji), Angola, June 5, 1903 (Brit.; nom. vulg., Kebullo; decocta pro vulnerum lavatione insumpta, fide Gossweileri); *idem* 4338, open thickets, Kaconda (Kakonda), Distr. of Benguella (Benguela), Angola, February, 1907 (Brit.); *idem* 5727, here and there in *Andropogon* beds at Camondai and N'dalatando, Angola, May 20, 1912 (Brit.; forma olim pro var. *Welwitschii* Sherff habita); *R. Houy* (sub *H. Meyero*) 1213, southern Ussagara (Usagara, Uzagara), German East Africa, November, 1911 (Berl.); *L. Keil* 1, Musumba, Distr. Usambara, German East Africa, May 3, 1905 (Berl.); *idem* 10, alt. 2,000 meters, eodem loco, May 4, 1905 (Berl.); *O. Neumann* 79, alt. 2,300–2,800 meters, Sidamo region, Abyssinia, December 24, 1900 (Berl.; forma multis aristis omnino nudis, tantum una arista [uno hamo] retrorsum barbata visa); *Alex. Von Mechow* 131, Pungo-Andongo, Angola, January–April, 1879 (Berl.; Gray); *idem* 394, Malange (Malanji), Angola, January, 1880 (Berl.); *Welwitsch* 3272 pro parte, very rarè, to the left of the Caringa River, Angola, June, 1855 (Brit., type, and Kew, cotype of var. *Welwitschii* Sherff ined.; cum *B. Steppia var. ambacensi* commixt.); *idem* 3535, alt. 720–1,140 m., Pungo-Andongo, communic. April, 1883 (Brit.; Kew); *idem* 3536, frequent in open forests, especially near Sansamanda, Angola, May 1, 1857 (Brit.); *idem* 3537, thickets from N-gombe toward Puri-Cacarambola, Distr. Ambaca, Angola, October, 1856 (Brit.; necdum bene floruit); *idem* 3538, alt. 720–1,140 meters, Pungo-Andongo, Angola, communic. April, 1883 (Brit., 2 sheets; Kew).

In the Kew Herbarium, *Welwitsch* 3535 is mounted with *Welwitsch* 3538. These two had been regarded by Dr. Welwitsch in his manuscript as the same species. No. 3535 is the form with sessile, ovate, undivided but conspicuously dentate leaves represented more or less closely by *Gossweiler* 4338, *Neumann* 79, *Houy* 1213, and *Von Mechow* 394; still less so by *Gossweiler* 1227, which has lanceolate leaves.[1] *Von Mechow* 394 had been cited by Klatt (Ann. Naturh.

[1] Gossweiler's field label says "see 1224 that is the same." His 1224 is good *B. grandis*.

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Hofmus. Wien 7: 103. 1892) for *Bidens Buchneri* (Klatt) Sherff. To the type of *B. Buchneri* (*Buchner* 31) it does, indeed, offer a strong resemblance. In fact, I have suspected that through further such forms as *Von Mechow* 394, *B. grandis* may be proved to pass into *B. Buchneri* and perhaps even be shown to be conspecific. Certain it is that distinction is impossible in some cases except upon the questionable basis of upwardly (*B. grandis*) versus downwardly (*B. Buchneri*) barbed aristae.[1] For the present it seems wise to await more positive data before attempting to merge the two.

EXPLANATION OF PLATE CLXXI

Bidens grandis: a, flowering branch, ×0.67; *b*, marginal portion of leaf, upper surface, enlarged to show hairs, ×2.69; *c* (tripartite), *d* (simple), leaves, ×0.67; *e*, exterior involucral bract, ×2.69; *f*, interior involucral bract, ×2.69; *g*, ray corolla, ×2.69; *h*, palea, ×2.69; *i*, disc floret, ×2.69; *j*, achene, ×2.69; *a*, mainly (*b*, entirely) from *Welwitsch* 3535, but partly from *Welwitsch* 3538, both in Hb. Kew; *c*, *e–j*, from *Welwitsch* 3538, in Hb. Brit.; *d*, from *Gossweiler* 1227, ibid.

207. **Bidens coriacea** (O. Hoffm.) Sherff, Bot. Gaz. 81: 52. 1926. Pl. CLXXII.

Coreopsis coriacea O. Hoffm. in Engler, Pflanzenw. Ost-Afr. 414. 1899.

Coreopsis ruwenzoriensis S. L. Moore, Journ. Linn. Soc. 35: 345. 1902.

Bidens ruwenzoriensis (S. L. Moore) Sherff, Bot. Gaz. 59: 309. 1915.

Herba erecta, elata, verisimiliter 0.6–2 m. alta; caule glaberrimo vel ad summam interdum minute pubescenti; ramis validis, teretiquadrangularibus, adscendentibus. Folia sessilia, per paria plus minusve connata, oblonga vel oblongo-oblanceolata, firme membranacea, albido-virescentia vel glaucescentia, glabra vel faciebus obscure pubescentia et margine ciliata, subgrosse subsimpliciterque serrata dentibus saepius indurato-apiculatis, principalia 10–13 cm. longa et 3–4.5 cm. lata. Capitula magna ramulos singillatim coronantia, radiata, pansa ad anthesin plerumque 7–8 cm. lata et 1.5–2 cm. alta. Involucri bracteae 3- vel 4-seriatae, glabrae vel minute pubescentes, extimae (circ. 5) ovato-lanceolatae, foliosae et interdum sparsissime denticulatae, apice subacutae, usque ad 3 cm. longae et 1.5 cm. latae; interiores vix vel manifeste breviores, lanceolatae, margine non decoloratae. Flores ligulati circ. 12, lutei, ligula anguste ovato-oblongi, apice undulati vel circ. 3-denticulati, 2.3–3.5 cm. longi et

[1] In *Neumann* 79, among all the ovaries examined, one barb was found pointing downward; all the others were erect.

1–1.5 cm. lati; paleis lineari-lanceolatis, achaenia facile superantibus, 1–1.5 cm. longis. Achaenia atra vel atro-grisea, maxime obcompressa, oblonga, basi levissime angustata, margine apiceque erecto-setosa, utraque facie plus minusve erecto-setosa et circ. 8-sulcata, corpore 6–9 mm. longa et 1.8–2.3 mm. lata, biaristata vel rarius triaristata; aristis tenuibus, pro maxima parte nudis sed basim versus 1–3 setulis erectis instructis, 1.5–2.8 mm. longis.

Type specimen: Collected by *Fischer*, No. 367, Massai Plateau, British and German East Africa, March 26–30, 1886 (Berl.).

Distribution: Southwestern British East Africa, in region surrounding northern half of Lake Victoria Nyanza (Lake Ukerewe), and on the Massai Plateau passing into German East Africa.

Specimens examined: *R. Dümmer* 492, alt. 1,200 meters, dry slope, Hamaiba Hill, Uganda, British East Africa, October, 1913 (Brit.); *G. F. S. Elliot* 7410, in tall grass, Kavirondo, British East Africa, 1893–1894 (Brit.; Kew; type material of *Coreopsis ruwenzoriensis* Moore); *Fischer* 367 (type, Berl.); *Evan James*, Libu, Nandi Country, Uganda (Kew); *herb. Jean Lebrun* 4347, alt. 850–1,000 meters, near Mt. Ruwenzori, Belgian Congo, November, 1931 (Bruss.); *E. A. Mearns* 2524, alt. 650–1,110 meters, vicinity of Kabula Muliro, on trail from Entebbe, Victoria Nyanza, to Butiaba, Albert Nyanza, Uganda, December 26, 1909 (U.S.); *idem* 2625, alt. 650–1,110 meters, vicinity of Yilo, on trail from Entebbe to Butiaba, December 31, 1909 (U.S.); *H. Powell* 6, Kibose, British East Africa, 1906 (Kew); *W. Small* 1192, short-grass land at alt. 1,500 meters, foothills of Mt. Elgon, British East Africa, November, 1914 (Kew); *J. D. Snowden* 28, alt. 1,410 meters, Toro (Kyaka; east of and adjacent to Mt. Ruwenzori), Uganda, 1913 (Kew); *Alexander Whyte*, from Nandi to Mumias, etc., British East Africa, 1898 (Kew, 3 sheets).

The type of *Bidens ruwenzoriensis* (Moore) Sherff, *G. F. S. Elliot* 7410, was stated by Moore to have been collected at Mt. Ruwenzori, but the original field tag on the cotype at Kew gives, as the type locality, Kavirondo, some 400 kilometers to the east.[1] Both the type and the cotype consisted merely of fragments from the inflorescence. Thus the original description was necessarily very faulty and misleading as to general habit, size of leaves, etc. Fortunately, there have been received at Kew several additional specimens from

[1] The name *ruwenzoriensis* was not entirely inappropriate, since Mt. Ruwenzori was Elliot's destination, and his herbarium labels bear the heading, "Ruwenzori Expedition."

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the same general region, which show the species to be a tall, handsome perennial, doubtless reaching a height of 2 meters, although Small reported it as growing 2–3 feet. As the mutual identity of all these specimens admits of no doubt, I have taken advantage of them to draw up a fresh and amplified description of the species.

The type proper of *B. coriacea* consists of seven fragments from the inflorescence, which offer at least a superficial resemblance to the type of *B. ruwenzoriensis*. Indeed, Moore (loc. cit.) appears to have suspected them of being the same. In the *B. coriacea* type the outermost involucral bracts, as noted by Moore, are not noticeably longer than the inner ones, and the achenes are mainly triaristate. In the type material of *B. ruwenzoriensis*, also in the material by Dümmer, by Small, by Snowden, and by Whyte, the outermost bracts are easily the longest and the achenes are biaristate. In a former article (Bot. Gaz. 81: 52. 1926) I pointed out the similarity between the two forms. Since then I have studied the material by Sir Evan James, which has the achenes *biaristate* as in the type of *B. ruwenzoriensis*, but the outermost bracts not much longer than the others. With this connecting form at hand, there appears no justification for attempting further retention of *B. ruwenzoriensis* as a separate species.

EXPLANATION OF PLATE CLXXII

Bidens coriacea: a, flowering and fruiting branch, ×0.57; *b*, exterior involucral bract, ×1.72; *c*, *d*, *e*, various interior involucral bracts (*c*, *e*, ×2.3; *d*, ×1.7); *f*, ray floret, ×1.7; *g*, palea, ×1.7; *h*, disc floret, ×3.44; *i* (outer), *j* (inner), achenes, ×3.44; *k*, submature achene, ×2.29; *a*, from Snowden 28, in Hb. Kew; *b*, *d*, *f–j*, from *Scott Elliot* 7410 (cotype of *Bidens ruwenzoriensis* [S. L. Moore] Sherff), in Hb. Kew; *c*, *e*, *k*, from type of *Bidens coriacea*.

208. **Bidens Brucei** Sherff, Bot. Gaz. 97: 606. 1936.

a. Rami glabrati; achaeniorum aristis inferne robustis ±1 mm. longis. *B. Brucei* sensu stricto.

a. Rami pubescentes; achaeniorum aristis omnino tenuibus ±2 mm. longis.

b. Achaenia corpore 6–7 mm. longa . . . . . var. *β. pubescentior*.

b. Achaenia corpore 7–9 mm. longa . . . . . var. *γ. Swynnertonii*.

Herba fruticosa, perennis, erecta, ±1.8 m. alta, caulibus ramisque angulatis et non (nisi summam versus) pubescentibus. Folia inferne in petiolos hispido-tomentulosos usque ad 1.5 cm. longos supra saepe marginatos abrupto-angustata, petiolo adjecto 6–11 cm. longa et

2–4.5 cm. lata, indivisa, lanceolato-oblonga vel saepius subrhomboideo-ovata, grosse serrata, apice subacuta, utrinque hispida. Capitula pauca, pedunculos subrobustos apicaliter folio-bracteatos terminantia, radiata, pansa ad anthesin circ. 7 cm. lata et circ. 1.5–1.8 cm. alta. Involucri hispidi bracteae 3–4-seriales, laxe adgregatae, interdum patentes vel subreflexae, subaequales, plus minusve oblongae, apice acutae, 1–2 cm. longae, intimae apicem versus angustatae. Flores ligulati 10–12, flavi, ligula oblongi vel lineares, apice parce denticulati, 3–4 cm. longi et 0.6–1.6 cm. lati. Paleae oblonge lineares, apice subacuto coloratae alibi stramineae, 1.1–1.4 cm. longae. Achaenia late vel anguste oblongo-linearia, obcompressa, nigra, utraque facie circ. 8-sulculata, exalata, marginibus et facierum lineis perspicue erecteque papillato-setulosa, corpore 6–8 mm. longa et 1–2 mm. lata, apice erecte pauci-setosa et 2- (vel faciei ventralis costa mediana extensa saepe sub-3-) aristata aristis inferne robustis erecto-setosisque superne nudis tenuibusque ±1 mm. longis.

Type specimen: Collected by *Miss E. M. Bruce* (for whom named), No. 26, at altitude of 660 meters, Ulugurue, Morogoro, German East Africa, October 25, 1934 (Kew; nom. vulg., m-luga).

Distribution: Southeastern German East Africa.

Specimens examined: *Bruce* 26 (type, Kew); *B. D. Burtt* 4696, herb 3–4 ft. tall, on steep grass slopes, alt. 900 meters, Ulugurue Mts., above Morogoro, May 9, 1933 (Kew, 2 sheets).

Bidens Brucei var. β. **pubescentior** Sherff,
Bot. Gaz. 97: 607. 1936.

A specie caulibus ramisque breviter patenti-hispidulis achaeniorum minorum (corpore 6–7 mm. longorum) apice numerose erecteque setoso aristis regulariter 2 tenuissimis ±2 mm. longis non nisi base ipsa setosis differt.

Type specimen: Collected by *G. B. Wallace*, No. 294, herb 6 feet tall, at altitide of 900 meters, Morogoro District, German East Africa, February 16, 1932 (Kew; nom. vulg., luzasu).

Distribution: Southeastern German East Africa.

Specimens examined: *Wallace* 294 (type, Kew).

Bidens Brucei var. γ. **Swynnertonii** Sherff,
Bot. Gaz. 97: 607. 1936.

A var. *pubescentiore* achaeniis corpore 7–9 mm. longis et 2–2.2 mm. latis floribus ligulatis (tantum 8 pro singulo capitulo visis) forsan paucioribus differt.

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Type specimen: Collected by *C. F. M. Swynnerton*, No. 859, Hiwaga, German East Africa, April–June, 1921 (Brit.).

Distribution: Southeastern German East Africa.

Specimens examined: *Swynnerton* 859 (type, Brit.); *idem* 860, Kigobera, May–June, 1921 (Brit.).

209. **Bidens Crataegifolia** (O. Hoffm.) Sherff, Bot. Gaz. 76: 158. 1923. Pl. CLXXIII.

Coreopsis Crataegifolia O. Hoffm. Bot. Jahrb. 30: 431. 1901.

Herba perennis; caule lignescenti, nunc simplici et monocephalo, nunc ramoso et pluribus capitulis coronato, infra interdum glabrescenti, superne glanduloso-piloso, verisimiliter circ. 5–10 dm. alto. Folia subcoriacea, circumambitu ovato-lanceolata vel etiam lanceolata, basi in petiolum alatum 2–3 cm. longum angustata, petiolo adjecto 7–10 cm. longa et 2.5–3.5 cm. lata, utrinque scabro-pilosa, grosse dentata vel irregulariter et non profunde pinnatisecta, segmentis lateralibus acutis usque ad 17 mm. longis et 7 mm. latis dentibus calloso-apiculatis; folia suprema anguste oblonga vel etiam lineari-lanceolata, sessilia, integra, minora. Capitula magna, breviter pedunculata, radiata, pansa ad anthesin 6–7 cm. lata et 1–1.7 cm. alta. Involucri hemisphaerici basi glanduloso-villosi bracteae exteriores 7–11, oblongo-lineares, pilosae, apice callosae, 1–1.5 cm. longae; interiores paulo breviores, minus pilosae, ovato-lanceolatae, obtuse acuminatae. Flores ligulati circ. 8, ligula elliptici vel elliptico-oblanceolati, apice obtuso non perspicue denticulati, 3–3.5 cm. longi et 7–10 mm. lati. Achaenia submatura obcompressa, exalata, brunneo-nigrescentia, linearia, 6–6.5 mm. longa et 1–1.5 mm. lata, faciebus glabra, margine et apice inter aristas antrorsum setosa, biaristata aristis nudis circ. 0.5 mm. longis.

Type specimen: Collected by *W. Goetze*, No. 851, on unforested slopes at altitude of 1,800 meters, Yawulanda Mountain, Livingstone Mountains, German East Africa, April 18, 1899 (Berl.).

Distribution: German East Africa.

Specimens examined: *Goetze* 851 (type, Berl.: cotype, Brit.).

Native name said to be "maharrama." The foliage strongly suggests in outline that of some species of *Crataegus*. Hoffmann (loc. cit.) described the ovaries as winged, but a careful search through his type material shows that he used the term carelessly, for there is no trace of definite wings such as are usually found in true *Coreopsis*.

Their absence on the many submature achenes examined makes it appear preferable to class the species with *Bidens*.

The type sheet bears merely small, simple-stemmed plants.

EXPLANATION OF PLATE CLXXIII

Bidens Crataegifolia: a, flowering branch, ×0.62; *b*, detached leaf, ×0.62; *f*, lower surface of portion of leaf magnified to show pubescence, ×2.5; *d*, exterior involucral bract, ×2.5; *e*, interior involucral bract, ×2.5; *f*, ray corolla, ×1.25; *g*, palea, ×2.5; *h*, disc floret, ×3.74; *i*, submature achene, ×3.74; all from type.

210. **Bidens kilimandscharica** (O. Hoffm.) Sherff, Bot. Gaz. 59: 309. 1915. Pl. CLXXIV.

Coreopsis kilimandscharica O. Hoffm. Bot. Jahrb. 20: 234. 1894. Achaeniorum aristae glabrae vel ad basim antrorsum setosae.

B. kilimandscharica sensu stricto. Achaeniorum aristae ad apicem saepissime retrorsum hamosae.

var. *β. retrorsa.*

Erecta, perennis, 1–2.3 m. alta, subramosa (forsan valde ramosa) ramis herbaceis, aliter frutici non dissimilis sed verisimiliter nullo tempore frutex verus; caule ramisque obtuse tetragonis vel subteretibus, tomentulosis. Folia summa sessilia, cetera inferne sensim abrupteve angustata in petiolum latum 0.5–2.5 cm. longum, petiolo adjecto 3–9 cm. longa, utrinque densissime tomentulosa; nunc indivisa, oblonga vel ovata, basi truncata vel rotundata vel grosse cuneata, margine grosse crenata vel lobulata; nunc polymorpha, varie plus minusve (saepe profunde) sinuato-pinnatifida, dentibus lobisque rotundatis, ad apicem nunc obtusis, nunc calloso-mucronatis. Capitula magna, ad apices ramorum solitaria vel in cymis oligocephalis disposita, breviter pedunculata, radiata, ad anthesin 5–8 cm. lata et 9–11 mm. alta. Involucrum tomentulosum; bracteis exterioribus 9–11, late lineari-oblongis, apice obtusis, 8–15 mm. longis, demum reflexis; interioribus lanceolatis subaequilongis. Flores ligulati 8–11, aurei, ligula elliptico-oblanceolati, apice subintegri, 2.5–4 cm. longi. Achaenia lineari-oblonga, valde obcompressa, nigrescentia, ad margines apicemque antrorsum ciliata, ad facies breviter pilosa, corpore 6–7 mm. longa et 1.5 forsan raro 2 mm. lata, biaristata; aristis de apice fere usque ad basim plerumque glaberrimis sed basi ipsa antrorsum setosis, 1–2 mm. longis.

Type specimen: Collected by *W. L. Abbott*, Kilimanjaro, German East Africa, 1890 (Berl.).[1]

[1] Abbott's specimen was the first one cited by Hoffmann. This was followed by *Volkens* 398 and 537.

Distribution: British East Africa and German East Africa, where common especially from Mt. Kenia to Mt. Kilimanjaro; occurring also in Angola.

Specimens examined: *W. L. Abbott*, Kilimanjaro, 1890 (type, Berl.: cotype, U.S.); *E. Battiscombe* 78, alt. 2,700–3,000 meters, Mt. Kenia, British East Africa, June 24, 1909 (Brit.); *Rudolph Endlich* 400, alt. 1,150 meters, forest-covered steppe, Kibohohe, Kilimanjaro, June, 1909 (Berl.); *idem* 400*a*, alt. 1,300 meters, Kibognoto, Kilimanjaro, July, 1909 (Berl.); *H. M. Gardner* 1416, alt. 2,250 meters, Maji Mazuri, British East Africa (Kew); *John Gossweiler* 3640, thicket-grown pasturage, Valley of River Kubal, near Kaconda, Angola, March, 1907 (Brit.); *F. Jaeger* 192, dry steppes, north slopes of Gua Mts., Iraku, German East Africa, September 14, 1906 (Berl., 2 sheets); *H. H. Johnston* (*Kilimanjaro Exped.*) 190, alt. 1,290 meters, 1884 (Kew); *T. Kassner* 870, Galunka, British East Africa, May 30, 1902 (Berl.; Brit.; Kew); *T. H. Marshall* 5, Moshi, German East Africa, 1927 (Kew); *W. E. Taylor*, eastern equatorial Africa, 1888 (Brit.); *Carl Uhlig* 414, bush region, southwestern Meru, German East Africa, October 21, 1904 (Berl.); *idem* 480, alt. 1,600 meters, in meadows, above Enzonzo Enzare, November 13, 1901 (Berl.); *Georg Volkens* 398, alt. 1,500 meters, abundant on grassy plateau, Distr. Uschiri, Kilimanjaro, June 14, 1893 (Berl.; Brit.); *idem* 537, alt. 1,200 meters, among bushes on road to the steppe, Distr. Marangu, German East Africa, July 6, 1893 (Berl.; Hamb.).

The branches as preserved in herbaria have the appearance of having come from a large, coarse herb. Uhlig, however, labeled his No. 414 a shrub ("Strauch d. Strauchregion") and Volkens, in labeling his own No. 537, likewise described it as a shrub ("Strauch bis 2 m. hoch"). The other collectors are silent upon this point. Hoffmann's description (loc. cit.) of the species as a shrub doubtless was based upon Volkens' label. It is doubtful, however, if the plants form true woody shrubs (frutices) in the common sense of the term.

The discontinuous distribution shown by the occurrence of this species in Angola as well as in British and German East Africa is notable. The Angola plant (*Gossweiler* 3640) was carefully compared with *Kassner* 870 from British East Africa and found to match well.

Bidens kilimandscharica var. *β.* **retrorsa** Sherff, Bot. Gaz. 92: 202. 1931.

A specie achaeniorum aristis ad apicem saepissime retrorsum hamosis differt.

Type specimen: Collected by *A. E. Haarer*, No. 1472, at altitude of about 1,200 meters, Doloti, Moshi District, German East Africa, August, 1928 (Kew).

Distribution: Known only from type locality in German East Africa.

Specimens examined: *Haarer* 1472 (type, Kew).

EXPLANATION OF PLATE CLXXIV

Bidens kilimandscharica: a, flowering and fruiting specimen, ×0.65; *b*, exterior involucral bract, ×3.27; *c*, interior involucral bract, ×3.27; *d*, ray corolla, ×1.63; *e*, palea, ×3.27; *f*, disc floret, ×3.27; *g*, achene, ×3.27; all from *Kassner* 870, in Hb. Brit.

211. **Bidens rhodesiana** Sherff, Bot. Gaz. 91: 309. 1931.
Pl. CLXX, figs. *j–p*.

Herba perennis, erecta, ramosa, verisimiliter circ. 8–10 dm. alta, breviter denseque hispida, caule ramisque tetragonis, internodiis elongatis. Folia subsessilia vel petiolata petiolis alatis usque ad circ. 1.3 cm. longis, petiolo adjecto 3–7 cm. longa (inferiora non visa), membranacea sed rigidula, circumambitu nunc late nunc anguste deltoideo-ovata, pinnata; foliolis lateralibus 1–2 jugis ovatis terminali ovato lanceolatove, omnibus dentatis dentibus obtusis vel etiam orbiculatis sed acriter mucronulatis. Capitula pauca, longe tenuiterque pedunculata, radiata, pansa ad anthesin 5–6 cm. lata et circ. 1–1.2 cm. alta. Involucri bracteae dorsaliter hispidae exteriores circ. 8, nunc lineari-oblongae nunc etiam oblongo-ovatae, apicaliter obtusae, circ. 4–8 mm. longae; interiores ovato-lanceolatae, 9–12 mm. longae. Flores ligulati circ. 9, flavi, ligula oblongo-oblanceolati, apice obscure 3-denticulati, 2–2.5 cm. longi. Paleae lineari-oblongae, circ. 7–8 mm. longae. Achaenia plana, atrobrunnea, lineari-oblonga, basim versus paulum angustata, faciebus glabra, utraque facie circ. 8-sulcata, marginibus antrorsum setosa, apice antrorsum setosa ac biaristata; aristis tenuibus, glabris, plerumque 1–1.5 mm. longis.

Type specimen: Collected by *A. J. Teague*, No. 226, in the Odzani River Valley, District of Manica, Division of Umtali, southern Rhodesia, 1914 (Kew).

Distribution: Known only from type locality in Southern Rhodesia.

Specimens examined: *Teague* 226 (type, Kew).

The leaves of the specimen illustrated (*Plate CLXX, figs. j–p*) resemble closely those of *Bidens ukambensis*. A second specimen on

the type sheet has the leaves more elongate, with the terminal leaflet having a narrowly lanceolate terminal lobe. The achenes are easily distinguished from those of *B. ukambensis*.

EXPLANATION OF PLATE CLXX, FIGS. *j–p*

Bidens rhodesiana: j, flowering and fruiting branch, ×0.63; *k*, exterior involucral bract, ×3.75; *l*, interior involucral bract, ×3.75; *m*, ray floret, ×2.5; *n*, palea, ×3.75; *o*, disc floret, ×5; *p*, achene, ×5; all from type.

212. **Bidens ukambensis** S. L. Moore, Journ. Linn. Soc. 35: 350. 1902. Pl. CLXX, figs. *a–i*.

Tomentuloso-pubescens, verisimiliter elata ac perennis; ramulis subteretibus, solidis, sparsim foliosis. Folia subsessilia vel petiolata petiolis usque ad 1.5 cm. longis (totum folium 3–5 cm. longum), leviter profundeve et pinnatim trisecta; segmentis ovatis, acutis, paucidentatis vel intermedio saepe trilobulato, dentibus acute indurato-mucronatis. Capitula subsessilia vel saepius pedunculata pedunculis usque ad 6 cm. longis, radiata, pansa ad anthesin ±3 cm. lata et ±8 mm. alta. Involucrum valde tomentuloso-hispidum; bracteis exterioribus 8–11, anguste lanceolatis, acutiusculis, demum squarroso-reflexis, 7–10 mm. longis; interioribus similibus, 9–12 mm. longis. Flores ligulati circ. 8, flavi, ligula obovato-oblongi, apice integri, circ. 1.5 cm. longi et involucrum multo superantes. Achaenia lineari-oblonga, acute tetragona, obcompressa, nigrescentia, omnino obsolete circ. 16-sulcata, apice angulisque adrecte setosa, faciebus subsparsim et breviter pilosa; corpore receptaculi paleas haud excedente 6–8 mm. longa et circ. 1.3 mm. lata, 2–4-(saepius 3- raro 4-) aristata; aristis tenuibus, fuscis, erectis, basi adrecte setulosis, alibi levibus vel supra saepe unco unico prominulo instructis, 2–2.5 mm. longis.

Type specimen: Collected by *G. F. Scott Elliot*, No. 6462, at altitude of 1,500–1,800 meters, in Ukamba, British East Africa, 1893–1894 (Brit.).

Distribution: Known only from type locality in Ukamba, British East Africa.

Specimens examined: *G. F. S. Elliot* 6462 (type, Brit.: cotype, Kew).

Moore compared this species in his manuscript with *Bidens robustior* and meant to describe it in print as near to that species—"near the last." Unfortunately, there happened a misarrangement

(fide correctionis in bibliotheca Brit.) of the text at the hands of the printer, as a result of which the "last" turned out unintentionally to be "*Bidens leucantha* Willd."

EXPLANATION OF PLATE CLXX, FIGS. *a–i*

Bidens ukambensis: a, b, upper leaves, ×0.63; *c,* portion of leaf enlarged to show tomentose surface, ×3.75; *d,* exterior involucral bract, ×3.75; *e,* interior involucral bract, ×3.75; *f,* ray corolla, ×2.5; *g,* palea, ×3.75; *h,* disc floret, ×3.75; *i,* achene, ×5; all from cotype in Hb. Kew.

213. **Bidens Volkensii** O. Hoffm. in Engler, Pflanzenw. Ost-Afr. C: 415. 1895. Pl. CLXXV.

Herba perennis, erecta, probabiliter 5–9 dm. alta, caule sulcato subteretique, ramis dense sed breviter subglanduloso-pilosis. Folia petiolata petiolis 4–9 mm. longis, petiolo adjecto 2–4 cm. longa, remota, circumambitu plus minusve ovata, indivisa vel triloba, grosse crenata, dense piloso-pubescentia, dentibus acriter calloso-apiculatis. Capitula longissime pedunculata cymam oligocephalam laxam formantia pedunculis tenuibus usque ad 18 cm. longis, radiata, pansa ad anthesin circ. 2–2.5 cm. lata et 7–8 mm. alta. Involucri bracteae villosae, exteriores circ. 6–8, lineares, obtusae vel acriter apiculatae, erectae vel reflexae, circ. 4–5 mm. longae, quam interiores membranaceae lanceolatae multo breviores. Flores ligulati 5–8, lutei, ligula elliptici vel ovato-lanceolati, apice denticulati. Achaenia lineari-oblanceolata, obcompressa, atra, antrorsum plus minusve setoso-hispida, faciebus 8-sulcata, corpore 5–6 mm. longa et circ. 1 mm. lata, biaristata aristis retrorsum hamosis circ. 1.5 mm. longis.

Type specimen: Collected by *Georg Volkens,* No. 1694, on the Quare[1] River below Madwame, Kilimanjaro region, eastern equatorial Africa, December 26, 1893 (Berl.).

Distribution: Region of Mt. Kilimanjaro, eastern equatorial Africa.

Specimens examined: *Volkens* 1694 (type, Berl.).

EXPLANATION OF PLATE CLXXV

Bidens Volkensii: a, flowering branch, ×0.7; *b,* exterior involucral bract, ×5.6; *c,* interior involucral bract, ×4.2; *d,* ray floret, ×2.1; *e,* palea, ×4.2; *f,* disc floret, ×5.6; *g,* achene, ×4.2; all from type.

[1] Spelled Ouri on Volkens' label. Same as Limpopo River.

214. **Bidens lineata** Sherff, Bot. Gaz. 76: 84. 1923.
Pl. CLXXVI.

Herba gracilis, forsan perennis, verisimiliter 5–7 dm. alta; caule moderatim ramoso, subtetragono, sulcato, breviter setoso, internodiis quam foliis plerumque multo longioribus. Folia subsessilia vel breviter petiolata petiolis 2–6 mm. longis, petiolo adjecto 1–4 cm. longa, pinnata; foliolis 3 vel 5, dentatis vel pinnatisectis; lobis linearibus vel lanceolatis, ciliatis et ad costas setosis, aliter hispidis vel etiam fere glabratis, apice plerumque acriter indurato-apiculatis. Capitula radiata, pauca, singillatim fines ramorum terminantia, pansa ad anthesin circ. 3–3.5 cm. lata et 7–8 mm. alta; pedunculis tenuibus 7–15 cm. longis. Involucri bracteae subaequales, 4–7 mm. longae, dorso hispidae, exteriores late lineares, supra saepe latiores, apice obtusae. Flores ligulati 6–8, flavi, elliptico-oblanceolati, apice minute et obscure denticulati, 1.2–1.6 cm. longi. Achaenia nigra, linear-clavata, tumido-obcompressa, utraque facie 8-sulcata, marginibus et supra inter sulcos antrorsum hispida vel tuberculato-hispida, corpore circ. 5 mm. longa et 1.2–1.5 mm. lata, tenuiter biaristata, aristis lineatis vel lineis rectis valde similibus, retrorsum hamosis, circ. 2 mm. longis.

Type specimen: Collected by *Rudolph Endlich*, No. 117, at altitude of 1,500 meters, on grass steppe, Kilimanjaro, German East Africa, summer of 1909 (Berl.).

Distribution: Known only from type locality in Kilimanjaro, German East Africa.

Specimens examined: *Endlich* 117 (type, Berl.).

The type specimen had been determined at Berlin as *Coreopsis exaristata* O. Hoffm. (*Bidens microcarpa* Sherff), to which it does bear a strong resemblance. The characters of the involucre and of the aristate achenes, however, are very distinct.

EXPLANATION OF PLATE CLXXVI

Bidens lineata: a, flowering and fruiting branch, ×0.62; *b*, lower surface of portion of leaf, enlarged to show pubescence, ×3.72; *c*, exterior involucral bract, ×3.1; *d*, interior involucral bract, ×3.1; *e*, ray corolla, ×2.48; *f*, palea, ×3.1; *g*, disc floret, ×3.1; *h*, achene, ×3.72; all from type.

215. **Bidens Aspilioides** (Baker) Sherff, Bot. Gaz. 94: 590. 1933.

Coreopsis Aspilioides Baker, Kew Bull. 1898: 153. 1898.

Herba perennis, erecta; caulibus circ. 3–6 dm. altis, ramosis, hispidis, remote foliatis. Folia opposita, sessilia, lanceolata, adscen-

dentia, integra vel parce dentata, utrinque viridia, scabra, circ. 7.5–10 cm. longa. Capitula radiata, ad apices ramorum solitaria vel pauca corymbosa. Involucrum campanulatum, 8 mm. altum, bracteis aequilongis lanceolatis foliaceis hispidis. Flores ligulati, aurantiaci; ligulis apice profunde fissis, circ. 1.2 cm. longis. Paleae lanceolatae, rigidae, 6–8 mm. longae. Achaenia faciebus marginibusque glabra, apice biaristata aristis parvis lanceolatisque.

Type specimen: Collected by *Alexander Whyte*, at altitude of 750–1,050 meters, Zomba, Nyassaland.[1]

Distribution: Known only from type locality in Nyassaland.

Specimens examined: None.

216. **Bidens Schweinfurthii** Sherff, Bot. Gaz. 59: 309. 1915. Pl. CLXXVII.

Coreopsis linearifolia Oliv. & Hiern in Oliv. Fl. Trop. Afr. 3: 390. 1877.

Bidens linearifolia (Oliv. & Hiern) Sherff, Bot. Gaz. 70: 109. 1920; non *B. linearifolia* Schz. Bip. in Seemann, Bot. Voy. Herald 307. 1852–1857.

Perennis, erecta, 1.2–1.5 m. alta; caule inferne subtereti, superne angulato, purpurascenti, e basi lignea, simplici vel supra parce ramoso, glabro. Folia crassiuscula, marginibus induratis revoluta involutave et scabrido-ciliata, aliter glabrata; principalia plerumque elongato-linearia atque indivisa, utrinque longe acuminata, non distincte petiolata, 5–15 cm. longa et 5–8 (interdum –16) mm. lata; quaedam alia (praesertim minora) saepe irregulariter et profunde bivel trisecta, lobis linearibus acutisque. Capitula pauca, 1–3 in unico ramulo, radiata, pansa ad anthesin 3.5–5 cm. lata et 1.3–1.6 cm. alta, pedunculata pedunculis 1–12 cm. longis. Involucrum basi hispido-scabridum; bracteis exterioribus 7–9, linearibus vel linearilanceolatis, glabris vel raro margine parce spinuloso-ciliatis, crassiusculis, supra quandoque angustatis, apice obtusis acutisve, 9–13 mm. longis, interiores lanceolatas aequantibus. Flores ligulati 8–16, flavi, ligula anguste elliptico-lanceolati, apice saepius tridentati, 2.3–2.8 cm. longi. Achaenia lineari-oblonga, valde obcompressa vel plana, subnigra vel nigrescentia, utraque facie circ. 8-sulcata, ad angulos marginesque setis suberectis patentibusve et tuberculo insidentibus setosa; apice vel valde setosa et biaristata aristis tenuibus calvis 0.3–1.1 mm. longis, vel saepe exaristata; corpore 9–12 mm. longa, paleas parce superantia.

[1] Type apparently lost.

BIDENS DIELSII Sherff

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Type specimen: Collected by *Georg August Schweinfurth*, Ser. II, No. 27, steppes near Agada, Djur-land (Jur-land), October 20, 1869 (Kew).

Distribution: Uganda (in British East Africa) and northwestward into Djur-land (of southeastern Sudan and to the northeast of the Belgian Congo); apparently also in Belgian Congo.

Specimens examined: *M. T. Dawe* 914, Acholi Country, Uganda (Kew); *Lathouwers*, Niaramba (Belgian Congo?), May 10, 1932 (Mus. Cong., 3 sheets; forma); *Schweinfurth* II, 27 (type, Kew: cotypes, Berl.; Brit.; Par.).

EXPLANATION OF PLATE CLXXVII

Bidens Schweinfurthii: a (lower), *b* and *c* (upper), portions of flowering specimens, ×0.68; *d*, *e*, tripartite leaves, ×0.68; *f*, exterior involucral bract, ×2.05; *g*, interior involucral bract, ×2.05; *h*, ray corolla, ×1.37; *i*, palea, ×2.05; *j*, disc floret, ×2.73; *k*, achene, ×2.73; *a–c*, *f–h*, *j*, from type; *d*, *e*, *i*, *k*, from *Dawe* 914, in Hb. Kew.

217. **Bidens nyikensis** Sherff, Bot. Gaz. 81: 50. 1926.
Pl. CLXXVIII.

Herba, verisimiliter perennis; caule simplici forsan ramoso, angulato, glabro vel ad summam piloso, ±3 dm. alto. Folia petiolata petiolis ciliatis anguste alatis 2.5–3.5 cm. longis, petiolo adjecto 4–11 cm. longa, pinnata, 3–5-partita; foliolis parce membranaceis, late linearibus vel rhomboideo-lanceolatis, 0.2–1.8 cm. latis, integris vel lateraliter 1–2 lobis instructis, margine revolutis spinuloso-ciliatisque, omnibus segmentis apice acutis. Capitula solitaria, terminalia, moderatim pedunculata pedunculo piloso usque ad 6 cm. longo, radiata, pansa ad anthesin ±3 cm. lata et ±9 mm. alta. Involucri hispidi bracteae exteriores circ. 8, moderatim vel late lineares, apice subacutae, 7–9 mm. longae et 1.2–2 mm. latae, interiores lanceolatae circ. 9–11 mm. longae. Flores ligulati circ. 8–10, flavi, tantum immaturi visi. Achaenia atra, lineari-oblonga, obcompressa, duabus faciebus non nisi ad summam hispida sed quaque circ. 8 sulculis lineata, margine apiceque valde erecto-ciliata, corpore 6.5–8.5 mm. longa et 2–2.7 mm. lata, biaristata; aristis tenuibus, supra sparsissime infra saepe dense erecto-hispidis, 2–3 mm. longis, palearum apices coloratos parce superantibus.

Type specimen: Collected by *Alexander Whyte*, No. 191, at altitude of 1,800–2,100 meters, Nyika Plateau, British Central African Protectorate, June, 1896 (Kew).

Distribution: Known only from Nyika Plateau, British Central African Protectorate.

Specimens examined: *Whyte* 191 (type, Kew).

EXPLANATION OF PLATE CLXXVIII

Bidens nyikensis: a, fruiting specimen, ×0.63; *b*, portion of leaf, magnified to show bristly edge, ×12.6; *c*, exterior involucral bract, ×3.78; *d*, interior involucral bract, ×3.78; *e*, ray floret, ×3.78; *f*, *g*, paleae, ×3.78; *h*, *i*, disc florets, ×3.78; *j*, *k*, achenes, ×3.78; all from type.

218. **Bidens Rogersii** Sherff, Bot. Gaz. 81: 52. 1926.
Pl. CLXXIX.

Herba perennis, erecta, glabra, simplex forsitan ramosa, ±5 dm. alta. Folia petiolata petiolis alatis 0.5–3 cm. longis, petiolo adjecto 4–8 cm. longa, pinnatim 3–7-partita; foliolis crassiusculis, margine revolutis et sparsim ciliatis, linearibus, lateralibus usque ad 5 cm. longis, terminali elongato usque ad 7 cm. longo, omnibus integris vel pinnatisectis dentibus (lobulis) linearibus patentibus. Capitula solitaria, longe pedunculata, forsitan radiata (nullis ligulis visis), involucro ad anthesin ±2.3 cm. lato et ±1.1 cm. alto. Involucri bracteae aequilongae, exteriores circ. 8, lineares, infra hispidae, apice acutae, 0.9–1.2 cm. longae; interiores ovato-lanceolatae, margine decoloratae, dorso glabratae vel parce hispidae. Achaenia submatura nigrescentia, lineari-oblonga vel lineari-oblanceolata, valde obcompressa, utraque facie circ. 8-sulcata, margine apiceque valde faciebus aegre erecto-setosa, corpore 6–8 mm. longa et 1.8–2.2 mm. lata, biaristata; aristis tenuibus, calvis vel sparsim erecto-setosis, 2–3 mm. longis.

Type specimen: Collected by *F. A. Rogers*, No. 10046, Sakania, Belgian Congo, August 18, 1911 (Kew).

Distribution: Known only from type locality, Sakania, Belgian Congo.

Specimens examined: *Rogers* 10046 (type, Kew).

EXPLANATION OF PLATE CLXXIX

Bidens Rogersii: a, subfruiting specimen, ×0.63; *b*, exterior involucral bract, ×3.78; *c*, interior involucral bract, ×3.78; *d*, very immature ray floret, ×9.45; *e*, palea, ×3.78; *f*, disc floret, ×3.78; *g*, *h*, submature achenes, ×3.78; all from type.

BIDENS NEUMANNII Sherff

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219. **Bidens chaetodonta** Sherff, Bot. Gaz. 90: 387. 1930. Pl. CLXXX, figs. *a*, *c–i*.

Coreopsis abyssinica Schz. Bip. in Walp. Repert. 6: 163. 1846.

Verbesina abyssinica (Schz. Bip.) A. Richard, Tent. Fl. Abyssin. 1: 409. 1847.

Prestinaria (*Steppia*) *abyssinica* Schz. Bip. in Herb. Schimp. Abyssin. sect. I, No. 332 ex O. & H. in Oliver, Fl. Trop. Afr. 3: 389. 1877.

Foliorum segmenta principalia anguste linearia circ. 1.5–3 mm. lata. var. *β. glabrior*.

Foliorum segmenta principalia late linearia vel lineari-lanceolata, plerumque 4–9 mm. lata. . . . . *Bidens chaetodonta* sensu stricto.

Herba perennis, erecta, 6–10 dm. alta, caule saepe subtetragono inferne glabra superne plerumque scabrido-pubescens. Folia opposita, principalia petiolata petiolis planis anguste marginatis inferne saepe hispido-ciliatis usque ad 4.5 cm. longis, petiolo adjecto 7–15 cm. longa, circumambitu ovata vel deltoidea, 2–3-pinnatisecta, saepius 5–7-partita; foliolis saepius oblonge linearibus vel lineari-lanceolatis, terminaliter elongatis et integris, apice acutis, basaliter angustatis et remote dentatis dentibus acerrimis nunc elongatis perspicuisque nunc parvis capilliformibusque, infra pallidioribus, margine ciliatis, faciebus plus minusve scabrido-hispidis, saepius 4–9 mm. latis. Capitula tenuiter pedicellata pedicellis hispidis 1–12 cm. longis, radiata, pansa ad anthesin 2–4 cm. lata et 7–9 mm. alta. Involucri bracteae exteriores 10–14, lineares, dorso plerumque glabrae, marginibus superne scabrido-ciliatae, 8–12 mm. longae et circ. 1 mm. altae, interioribus lanceolatis dorsaliter hispidis saepius aequales. Flores ligulati circ. 8, aurei, ligula elliptico-oblongi, apice rotundato obscure denticulati, 1.2–2 cm. longi et 3–5 mm. lati. Paleae lineari-oblongae, apice obtusae, glabrae, ±7.5 mm. longae. Achaenia valde obcompressa, nunc late nunc anguste lineari-oblonga, atra, utraque facie adpresse setosa et circ. 8-sulcata, marginibus erecto-setosa, margines versus tenuissime et non distincte alata, corpore circ. 4–4.5 mm. longa et 1.2–1.5 mm. lata, apice setosa et biaristata; aristis tenuibus, stramineis, antrorsum hispidis, circ. 1–1.6 mm. longis.

Type specimen: Collected by *Wilhelm Schimper*, No. 332, in the upper region, northern side, of Mt. Scholoda, Abyssinia, October 3, 1837 (Par.).

Distribution: Abyssinia.

Specimens examined: *Chiovenda* 3151, Semien, Prov. Amhara, December 7, 1909 (Flor., 2 sheets); *Ellenbeck* 1622, alt. 2,600 meters, Mt. Furi, Schoa, November 2, 1900 (Berl.; forma foliis minus divisis); *A. Petit*, Abyssinia (Par.); *idem*, Chiré (Berl.); *Quartin-Dillon*, Abyssinia (Par.); *Schimper* 332 (type, Par.: cotypes, Berl.; Gray; Kew; Par., 4 sheets).

Bidens chaetodonta var. *β.* **glabrior** (O. & H.) Sherff, Bot. Gaz. 90: 388. 1930. Pl. CLXXX, fig. *b*.

A specie foliolis anguste linearibus tantum 1.5–3 mm. latis inferioribus saepe pinnatisectis differt.

Type specimen: Collected by *Antonio Petit* at Chiré, Abyssinia (Kew).

Distribution: Eritrea and Abyssinia.

Specimens examined: *R. E. Cheesman*, alt. 2,010 meters, Dancila, 40 miles south of Lake Tana, May 9, 1926 (Brit.); *Ellenbeck* 1566, alt. above 2,000 meters, Akaki, South Schoa, August 13, 1900 (Berl.); *idem* 1592, alt. about 2,300 meters, Adis Abeba, Schoa, October 3, 1900 (Berl.); *idem* 1614, growing 1 meter high, alt. 2,300 meters, Akaki, South Schoa, December 26, 1900 (Berl.); *A. Pappi* 5205, alt. about 2,610 meters, Mt. Zagher, Eritrea, May 20, 1902 (Flor.); *A. Petit*, Chiré (type, Kew); *idem* 138, eodem loco, August, 1840 (Par.); *idem* 587, eodem loco (Par.); *Hugh Scott*, alt. 2,850 meters, Mt. Chillálo, November, 1926 (Kew).

EXPLANATION OF PLATE CLXXX

Bidens chaetodonta, figs. *a*, *c–i*: *a*, flowering branch, ×0.61; *c*, exterior involucral bract, ×4.86; *d*, interior involucral bract, ×4.86; *e*, portion of *d*, magnified more highly to show basally flattened median hairs, ×24; *f*, ray corolla, ×2.43; *g*, palea, ×4.86; *h*, disc corolla, ×4.86; *i*, achene, ×4.86; all from type and cotypes, in Hb. Par.

Bidens chaetodonta var. *glabrior*, fig. *b*: cauline leaf, ×0.61; from type.

220. **Bidens Rueppellii** (Schz. Bip.) Sherff, Bot. Gaz. 90: 389. 1930. Pl. CLXXXI.

Coreopsis Rueppellii Schz. Bip. in Walp. Repert. 6: 163. 1846.

Verbesina Ruppellii (Schz. Bip.) A. Richard, Fl. Tent. Abyssin. 1: 410. 1847.

BIDENS TERNATA (Chiov.) Sherff

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Verbesina Rueppellii (Schz. Bip.) A. Rich. ex Vatke, Linnaea 39: 499. 1875.

Herba perennis, erecta, verisimiliter usque ad 1 m. alta, caule subsimplici subtereti scabrido-pubescenti supra corymboso. Folia brevissime petiolata petiolis alato-marginatis raro usque ad 1 cm. longis, omnino 4–10 cm. longa, pinnatim 3–5-partita; foliolis scabris, siccis subrigidis, acriter dentatis dentibus mucronato-setigeris interdum elongatis, lateralibus ovato-lanceolatis, terminali majore circ. 2–3 cm. lato. Capitula subtenuiter pedunculata pedunculis usque ad 8 cm. longis, radiata, pansa ad anthesin circ. 5 cm. lata et circ. 8–10 mm. alta. Involucri bracteae exteriores 11–18, lineari-spathulatae, pallidae, supra spinuloso-ciliatae, dorso fere glabratae vel saepius secundum costam medianam hispidae, apice nitidenti callosoque acerrimae, 6–10 mm. longae et 1–1.5 (vel etiam –2.5) mm. latae; interiores oblongo-lanceolatae subaequales, apice attenuato valde pubescentes, dorso inter margines flavido-diaphanas atro-brunneae ac pilis albescentibus (medianis inferne lato-membranaceis) valde hispidae. Flores ligulati circ. 12, aurei, ligula lineari-elliptici, apice integri, 4–6 mm. lati. Paleae lineari-oblongae, nitidae, secundum medium linea duplici colorata percursae, circ. 5 mm. longae. Achaenia immatura plana, anguste lineari-oblanceolata, erecto-ciliata, faciebus superne adpresso-setosa, corpore circ. 3.5 mm. longa et circ. 0.5 mm. lata, apice erecto-setosa et biaristata aristis filiformibus antrorsum hispidis circ. 0.5–1 mm. longis.

Type specimen: Collected by *Eduard Rüppell* at Siemen, Abyssinia, in August or September, 1832 (Par.).

Distribution: Abyssinia.

Specimens examined: *Emilio Chiovenda* 2906, Darà, Uogherà, Prov. Amhara, November 28, 1909 (Flor.); *idem* 2930, Debarek, Semien, Prov. Amhara, November 29, 1909 (Flor., 2 sheets); *Rüppell*, Siemen, August or September, 1832 (type, Par.); *Wilhelm Schimper* (*itin. abyssin. sect. V, No. 706B, ed. Buchinger ann.* 1854), Abyssinia (Par., 2 sheets).

EXPLANATION OF PLATE CLXXXI

Bidens Rueppellii: a, flowering branch, ×0.6; *b–d*, separate leaves, ×0.6; *e*, exterior involucral bract, ×4.23; *f*, interior involucral bract (the somewhat numerous basally flattened median hairs not so shown here), ×4.23; *g*, ray floret, ×1.81; *h*, palea, ×4.23; *i*, disc floret, ×4.83; *j*, achene, ×4.23; *a*, *c–e*, *g*, *i*, *j*, from *Chiovenda* 2930, 2 sheets in Hb. Flor.; *b*, *f*, *h*, from *Rueppell's* fragment on type sheet.

221. **Bidens Vatkei** Sherff, Bot. Gaz. 90: 388. 1930.
Pl. CLXXXII.

Coreopsis chrysantha Vatke, Linnaea 39: 499. 1875; non L. Sp. Pl. ed. 2. 2: 1282. 1763.

Herba perennis, erecta e radice lignea crassaque, pallida, 6–12 dm. alta; caulibus tenuibus, subtetragonis, striatis, inferne glabris, superne hispidulis subsimplicibusque. Folia tenuiter petiolata petiolis hispido-ciliatis dorso plerumque glabris usque ad 4 cm. longis, petiolo adjecto 5–12 cm. longa, tripartita; foliolis lanceolatis linearibusve, utrinque cuneato-angustatis, membranaceis, acerrime serratis dentibus inferioribus saepe capilliformibus, supra scabridis infra breviter hispido-pubescentibus, terminali majore 0.4–1.9 cm. lato. Capitula perpauca (circ. 2–4 ad unici caulis terminum), tenuiter pedunculata pedunculis hispidis usque ad 1.5 dm. longis, radiata, pansa ad anthesin circ. 3–4 cm. lata et circ. 1 cm. alta. Involucri bracteae exteriores 9–11, lineari-subspathulatae, apice acerrime mucronatae, sparsim ciliatae et dorso aegre hispidulae, circ. 6–7 mm. longae; interiores ovato-lanceolatae, hispidae, paulo longiores. Flores ligulati circ. 12–13, aurei, ligula circ. 6–7-striati et lineares, 1.5–2 cm. longi et tantum 2–4 mm. lati; flores tubulosi sicci ad medium ut videtur articulati ac saepe inflati. Achaenia oblonga, valde obcompressa, brunneo-nigra, utraque facie circ. 8-sulcata, margine erecto-setosa, faciebus superne erecto-hispida, corpore 3–4 mm. longa et 0.7–1.1 mm. lata, apice erecto-setosa et biaristata aristis tenuissimis stramineis antrorsum hispidulis circ. 1.5–2 mm. longis.

Type specimen: Collected by *Wilhelm Schimper*, at altitude of 2,100 meters, in Valley of the Repp River at Dewari, Abyssinia, October 2, 1863.[1]

Distribution: Known only from Abyssinia.

Specimens examined: *Emilio Chiovenda* 1699, Gondar, Dembià, Prov. Amhara, August 28, 1909 (Flor.; forma foliis majoribus, foliolis latioribus terminali usque ad 3.5 cm. lato); *idem* 1992, near Asosò, Dembià, September 13, 1909 (Flor.); *Schimper*, alt. 2,100 meters, Repp River Valley, Dewari, October 2, 1863 (Berl., 2 sheets of type material).

EXPLANATION OF PLATE CLXXXII

Bidens Vatkei: *a* (lower), *b* (upper), portions of fruiting specimen, ×0.55; *c*, cauline leaf, ×0.55; *d*, portion of leaf, magnified to show

[1] Herbarium not cited for type, but one of the two Berlin specimens has the determination "*Coreopsis chrysantha* Vatke" in a particularly bold handwriting, the same as seen on numerous other specimens typifying Vatke's species and varieties and which without question was by Vatke himself.

pubescence, ×5.5; *e*, exterior involucral bract, ×3.31; *f*, interior involucral bract, ×3.31; *g*, ray floret, ×2.21; *h*, palea, ×3.31; *i*, disc corolla, ×4.97; *j*, achene, ×4.42; *a*, *b*, *d–f*, *h–j*, from 2nd type sheet; *c*, *g*, from *Chiovenda* 1699, in Hb. Flor.

222. **Bidens rotata** Sherff, Bot. Gaz. 90: 391. 1930.
Pl. CLXXXIII.

Coreopsis Buchingeri Schz. Bip. ex Schweinf. & Aschers. Enum. 284 (nomen).

Herba perennis, erecta, 6–10 dm. alta, supra ramosa, caule infra fere glabra supra hispida. Folia opposita subtenuiter petiolata petiolis planis hispido-ciliatis basaliter in poculum circ. 1 mm. altum connatis usque ad 2 cm. longis, petiolo adjecto saltem 4–7.5 cm. longa, tripartita foliolis membranaceis apicaliter subacuminatis ad medium usque ad 2.7 cm. latis nunc ovatis nunc lanceolatis supra viridibus ac subglabris infra pallidis ac papillato-hispidis margine ciliatis ac acerrime serratis dentibus mucronato-setigeris. Capitula tenuiter pedunculata pedunculis hispidis usque ad 18 cm. longis, radiata, pansa ad anthesin circ. 3.5 cm. lata et 1–1.2 cm. alta. Involucri bracteae exteriores 10–13, lineari-subspathulatae, pallidae, dorso subglabrae vel aegre adpresso-hispidae, margine spinuloso-ciliatae, apice nitido calloso-mucronatae, 1–1.6 cm. longae et 1–2 mm. latae, saepe interiores ovato-lanceolatas dorsaliter hispidas (setis medianis inferne lato-membranaceis) apicaliter ciliatas paulo superantes. Flores ligulati 12, aurei, ligula anguste oblongo-elliptici, apice 2–3-denticulati, circ. 1.5 cm. longi et circ. 4–5 mm. lati; tubulosi superne aurantiaci, sicci ad medium plus minusve tumidi vel fracti vel articulati. Achaenia plana, lineari-oblonga, nigra, utraque facie circ. 4-sulcata et superne adpresso-setosa setis erectis, marginibus erecto-setosa, margines versus tenuia sed non vere alata, corpore 4–6 mm. alta et 1–1.2 mm. lata, apice erecte setosa ac biaristata aristis tenuibus stramineis antrorsum hispidis circ. 2 mm. longis.

Type specimen: Collected by *Wilhelm Schimper* (*itin. abyssin. sect. V, No.* 706*a*, *ed. Buchinger ann.* 1854) in Abyssinia (Par.).

Distribution: Abyssinia.

Specimens examined: *Schimper* V-706*a* (type, Par.).

The type is in the Schultz Bipontinus Herbarium at Paris. By Schultz Bip. it had been given the name *Coreopsis Buchingeri*, which has appeared occasionally in literature but without description. The closest ally is *Bidens Rueppellii*. *B. rotata* appears to differ, however, in having more nearly glabrous stems, different foliage, larger involu-

cral bracts, and larger achenes. The slender rays, regularly 12, offer a fanciful resemblance to the spokes of a wheel, whence the trivial name. The interior involucral bracts have many of the lower median hairs of the dorsal surface expanded below into flat scales, as occurs sometimes in *B. chaetodonta* and commonly in *B. Rueppellii*.

EXPLANATION OF PLATE CLXXXIII

Bidens rotata: a, b, flowering and fruiting specimens, ×0.6; *c,* exterior involucral bract, ×2.4; *d,* interior involucral bract, ×2.4; *e,* portion of *d,* magnified more highly to show basally flattened median hairs, ×6; *f,* ray floret, ×2.4; *g,* palea, ×2.4; *h,* disc floret, ×4.8; *i,* achene, ×4.8; all from type.

223. **Bidens articulata** Sherff, Bot. Gaz. 94: 591. 1933.

Coreopsis glaucescens O. & H. in Oliver, Fl. Trop. Afr. 3: 389. 1877.

Coreopsis abyssinica f. *latisecta* Vatke, Linnaea 39: 499. 1875 (nomen subnudum).

Herba perennis e radicibus tuberoso-incrassatis plus minusve fasciculatis, erecta, circ. 1.2 m. alta; caule striato, supra plus minusve hispido pilis aegris patentibusque. Folia opposita, subsessilia vel petiolata petiolis planis marginatis hispido-ciliatis etiam 1.5 cm. longis, omnino 3–13 cm. longa, circumambitu ovata, pinnatim 3–5-partita; foliolis membranaceis, plerumque lanceolatis, apice acutis, marginibus acriter dentatis dentibus interdum in setas desinentibus (terminali plus minusve ovato saepe pinnatisecto lobis lanceolatis serratisque), infra pallidioribus et valde pubescentibus, supra sparsissime hispidis, lateralibus usque ad 5 cm. longis et ad 2 cm. latis. Capitula pauca, corymbosa vel corymboso-cymosa, subvalde pedunculata pedunculis hispidis 6–10 cm. longis, radiata, pansa ad anthesin circ. 4–5 cm. lata et circ. 8 mm. alta. Involucri bracteae exteriores 12–14, elongato-lineares, supra saepe spathulato-dilatatae, dorso marginibusque hispidae, apice acuto cartilagineo-induratae, 1.3–1.7 cm. longae et circ. 1–1.5 mm. latae; interiores lanceolatae, dorso hispidae, interdum paulo breviores. Flores ligulati forsitan 10, flavi, oblongo-lineares, apice vix denticulati, ±1.5 cm. longi. Paleae oblongo-lanceolatae, perspicue circ. 2-nerviae nervis brunneis, apicaliter acutae et aegre pubescentes, alibi glabrae, 7–8 mm. longae, achaenia valde superantes. Disci florum corollae ad medium anulato-articulatae, stigmatibus tenuiter elongato-caudatis. Achaenia oblongo-linearia vel lineari-oblonga, obcompressa, nigra, exalata, faciebus supra erecto-setosa, marginibus minutissime erecto-

BIDENS SETIGERA (Schz. Bip.) Sherff (figs. *j*, *k*); var. ABYSSINICA (Schz. Bip.) Sherff (figs. *a*–*i*)
BIDENS PRAECOX Sherff (fig. *l*)

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ciliata, corpore 3.5–4.5 mm. longa et 0.8–1.1 mm. lata, apice erecto-setosa et biaristata; aristis tenuibus, stramineis, antrorsum hispidis, circ. 1 mm. longis.

Type specimen: Collected by *Wilhelm Schimper*, No. 329, at Hedscha, Abyssinia, October 3, 1862 (Kew).

Distribution: Known only from type locality in Abyssinia.

Specimens examined: *Schimper* 329 (type, Kew: cotypes, Berl.; U.S.; this collection was the basis of *Coreopsis abyssinica* f. *latisecta* Vatke, published without description).

224. **Bidens Cirsioides** Sherff, Bot. Gaz. 90: 393, *pl. 5*. 1930. Pl. CLXXXIV.

Herba elata, verisimiliter perennis, glaberrima, pallida, 8–15 dm. alta, caule subtereti glaucescenti valde ramoso ramis elongatis plus minusve simplicibus. Folia petiolata petiolis planis anguste alatis basaliter dilatatis 0.5–2 cm. longis, petiolo adjecto usque ad 1.5 dm. longa, pinnatim 3 (–5) -partita; foliolis oblonge linearibus vel lineari-lanceolatis, crassiusculis, nunc perspicue acriterque dentatis dentibus elongatis saepe inflexis et saepe setigeris nunc setis pro dentibus munitis, infra albescentibus, margine saepe revolutis, terminali usque ad 12 cm. longo et 2.5 cm. lato lateralibus minoribus. Capitula numerosa corymboso-paniculata, tenuiter pedicellata pedicellis hispidis usque ad 1 dm. longis, radiata, pansa ad anthesin 4–5 cm. lata et 8–11 mm. alta. Involucri bracteae exteriores 16–24, subbiseriales, lineares, glaberrimae, apicem versus angustatae, apice ipso acriter calloso-mucronatae, 8–10 mm. longae et 0.5–1 mm. latae; interiores late lanceolatae, dorso ventreque apicaliter pubescentes alibi glabrae, saepe paulo breviores. Flores ligulati plerumque 12, flavi, ligula lineari-elliptici, paucistriati, apice subacuto vix denticulati, 1.8–2.3 cm. longi et circ. 3–4 mm. lati. Achaenia plana, lineari-oblonga, nigra, exalata, utraque facie circ. 6-sulcata, faciebus ac marginibus valde erecto-setosa, corpore circ. 5 mm. longa et circ. 1–1.1 mm. lata, apice erecto-setosa ac biaristata; aristis erectis, tenuibus, stramineis, antrorsum hispidis, 2–3 mm. longis.—Habitu specimen siccum foliis acriter dentatis nonnullis speciebus *Cirsii* simile.

Type specimen: Collected by *C. Ledermann*, No. 5440, growing 0.8–1.5 meters high at altitude of 1,200–1,400 meters, Gendero, Pass Tchape, Kamerun, October 5, 1909 (Berl.).

Distribution: Kamerun.

Specimens examined: *Ledermann* 5440 (type, Berl.).

EXPLANATION OF PLATE CLXXXIV

Bidens Cirsioides: a (lower), *b* (upper), portions of flowering and fruiting branch, ×0.58; *c*, exterior involucral bract, ×3.45; *d*, interior involucral bract, ×3.45; *e*, ray corolla, ×2.3; *f*, palea, ×3.45; *g*, disc floret, ×4.6; *h*, achene, ×4.6; all from type.

225. **Bidens chaetophylla** Sherff, Amer. Journ. Bot. 22: 705. 1935.

Herba perennis, erecta, subgracilis, glabra, ±1.5 m. alta; caule subtereti, internodiis imis ±1 cm. aliis usque ad 13 cm. longis. Folia petiolata petiolis marginatis 0.5–3 mm. latis et nunc (caulis basim versus) 4–7 cm. nunc (alibi) 2–3.5 cm. longis, petiolo adjecto 1.5–2.3 dm. longa, ima indivisa alia pinnatim tripartita; lamina vel foliolis elongato-linearibus, tantum 2–9 mm. latis sed saepe 10–16 cm. longis, membranaceis, ad apicem acrem sensim angustatis, marginibus plerumque remote setigeris (setis circ. 2–4.5 mm. longis) rarius integris. Capitula pauca, subcorymbosa, tenuiter pedicellata pedicellis demum glabris usque ad circ. 7 cm. longis, radiata, pansa ad anthesin ±4 cm. lata et ±1 cm. alta. Involucri glabrati bracteae exteriores 12–16, tenuiter elongato-lineares saepe 1.5–2.5 cm. longae et discum multo superantes, superne subulatae; interiores ovato-oblongae, apice acutae, circ. 7 mm. longae. Flores ligulati flavi, ligula plus minusve lineari-oblongi, ±1.2 cm. longi. Achaenia matura non visa. Ovaria plana, lineari-oblonga, subatra, marginibus apiceque erecto-hispida, corpore ±1.2 mm. longa, biaristata; aristis tenuibus, antrorsum hispidis; circ. 2 mm. longis.

Type specimen: Collected by *Günther Tessmann*, No. 2704, on grass steppe, Kongola, Ngaundero (Ngaumdere) region, Kamerun, August 20, 1914 (Berl.).

Distribution: Known only from type locality in the Kamerun.

Specimens examined: *Tessmann* 2704 (type, Berl.; nom. vulg., nwa sole).

226. **Bidens Dielsii** Sherff, Bot. Gaz. 90: 388. 1930. Pl. CLXXXV.

Coreopsis chrysantha var. *simplicifolia* Vatke, Linnaea 5: 500. 1875.

Coreopsis simplicifolia (Vatke) Engler, Hochgeb. Fl. Trop. Afr. (Abh. Preuss. Akad. Wiss. 1891, ii:) 435. 1892.

Involucri bracteae exteriores plerumque 10–14, lineari-acuminatae vel anguste lanceolatae, 1.5–2.5 mm. latae. . .*B. Dielsii* sensu stricto.

Involucri bracteae exteriores plerumque circ. 16–18, lineari-subulatae, 0.6–1 (raro usque ad 1.5) mm. latae.....var. *β. medusoides.*

Herba perennis, erecta, rigida, subglaucescens, glaberrima vel parce scabra, ±12 dm. alta, caule subtereti, supra ramoso. Folia opposita, subsessilia, 6–15 cm. longa et 2–3.5 cm. lata, ovata vel anguste elliptica, acute apiculata, spinuloso-ciliata, principalia acriter serrata (summa subintegra) dentibus acerrimis et saepe apicem versus capilliformi-subulatis, basi angustata. Capitula pauca, corymbose disposita, pedunculata pedunculis scabridis usque ad 1.2 dm. longis, radiata, pansa ad anthesin circ. 3.5–4.5 cm. lata et circ. 1 cm. alta. Involucri scabrido-hispidi bracteae exteriores 10–14 (vel raro –18), lineari-acuminatae vel anguste lanceolatae, 8–15 mm. longae et 1.5–2.5 mm. latae, interioribus lanceolatis interdum longiores. Flores ligulati circ. 12, aurei, ligula anguste elliptici, apice 2–3-denticulati, 1.5–2 cm. longi et 3.5–5 mm. lati; tubulosi minuti cylindrici ad medium saepe tumidi vel sicci fracti, lobis apicalibus pubescentes, circ. 4 mm. longi. Achaenia plana, lineari-oblonga, nigra, utraque facie circ. 8-striata, faciebus (praecipue supra) antrorsum adpresso-setosa, margines versus tenuissime sed non distincte alata, marginibus antrorsum ciliata, corpore circ. 5 mm. longa et 0.9–1.2 mm. lata, apice corona setarum erectarum munita ac biaristata aristis erectis stramineis tenuissimis antrorsum hispidis circ. 1.5 mm. longis.

Type specimen: Collected by *Wilhelm Schimper*, at altitude of 2,100 meters, on mountains at Dewari, Abyssinia, October 2, 1863 (Berl., 2 sheets).

Distribution: Abyssinia.

Specimens examined: *A. Petit*, Abyssinia, 1862 (Kew); *Ragazzi* 1311, Abyssinia, 1887 (Flor., 2 sheets); *W. Schimper*, alt. 2,100 meters, on mountains, Dewari, October 2, 1863 (2 type sheets, Berl.).

Oliver and Hiern (Oliver, Fl. Trop. Afr. 3: 389. 1877) were inclined to regard this as a distinct species, as indeed Vatke had earlier suspected it of being. Oliver and Hiern noted that it had "the technical characters of *Wedelia;* the general appearance of the plant is however quite that of *Coreopsis.*" The plant matches *Bidens* in its achenes somewhat better than *Coreopsis.*

Bidens Dielsii var. *β.* **medusoides** Sherff,
Bot. Gaz. 91: 311. 1931.

A specie involucri bracteis exterioribus 14–20 (plerumque circ. 16–18), lineari-subulatis, 0.8–1 (rarius usque ad 2) cm. longis, inferne 0.6–1 (raro usque ad 1.5) mm. latis differt.

Type specimen: Collected by *T. D. Maitland*, No. 1004, frequent in grassland at altitude of 1,500 meters, Wasa, region of Mt. Ruwenzori, tropical east Africa, December 15, 1925 (Kew).

Distribution: Known only from type locality in tropical east Africa.

Specimens examined: *Maitland* 1004 (type, Kew).

In the young heads (much before anthesis) the exterior bracts are twice as long as the disc, with a resulting fanciful resemblance of these heads to the medusa stage of many of the Coelenterata in the animal kingdom.

EXPLANATION OF PLATE CLXXXV

Bidens Dielsii: a (upper), *b* and *c* (lower), portions of fruiting specimen, ×0.54; *d*, *e*, exterior involucral bracts, ×2.7; *f*, interior involucral bract, ×2.7; *g*, ray floret, ×2.16; *h*, palea, ×2.7; *i*, disc floret, ×4.32; *j*, achene, ×2.7; all from 2 type sheets.

227. **Bidens superba** Sherff, Amer. Journ. Bot. 22: 707. 1935.

Herba sine dubio perennis, erecta, rigida, infra simplex supra erecte ramosa, glabra (etiam inflorescentiae ramis), forsitan 1 m. alta, caule inferne subtereti superne subtetragono. Folia suberecta, breviter petiolata petiolis latis circ. 4–6 mm. longis, petiolo adjecto usque ad 17 cm. longa et 1.6–2.4 cm. lata internodia plerumque paulo superantia, anguste elongato-lanceolata, rigidulo-membranacea, supra medium usque ad apicem acutum elongato-attenuata, acriter sed non profunde serrulata dentibus saltem inferioribus in setas desinentibus imis interdum majoribus inflexisque, margine minutissime ciliata. Capitula paniculate disposita (unica panicula cum ±35 capitulis) pedicellis ultimis subrobustis pubescentibus saepius sub 1 cm. longis, radiata, pansa ad anthesin 4–5 cm. lata et 7–8 mm. alta. Involucri bracteae exteriores circ. 18–22, elongato-lineares, ciliatae et extrinsecus sparsim hispidae vel glabrescentes, 1–1.6 cm. longae; interiores oblongo-ovatae, pubescentes, circ. 7–8 mm. longae. Flores ligulati circ. 12, flavi, ligula ovato-oblongi vel elliptico-oblongi, apice 2- vel 3-dentati, 1.5–2.5 cm. longi. Paleae oblongae, apice abrupte vel subabrupte acutae. Achaenia plana, oblonga, brunneo-grisea, marginibus tenuibus non alata sed erecto-setosa, faciebus circ. 4–5-sulcata et superne plus minusve erecto-setosa setis subalbis, corpore 4.5–5 mm. longa et ±1.4 mm. lata, apice setulo-coronato biaristata aristis tenuissimis flavidis minutissime antrorso-hispidulis ±1 mm. longis.

Type specimen: Collected by *F. Jurion*, No. 41, Nioka, Luri (Ituri), Belgian Congo (2 sheets, Mus. Cong.).

Distribution: Northeasternmost Belgian Congo.

Specimens examined: *Jurion* 41 (Mus. Cong., 2 type sheets).

Apparently most closely allied to *B. Dielsii* var. *medusoides*, from which it differs in its stouter, straighter, and more rigid stem, its more slender and elongate leaves, its much more numerous and paniculately, not corymbosely, disposed heads, etc.

228. **Bidens Neumannii** Sherff, Bot. Gaz. 90: 394. 1930. Pl. CLXXXVI.

Herba perennis, subsimplex, saltem 3 dm. alta, suberecta e radice lignescenti, breviter tomentoso-hispida; caule subtereti, internodiis medianis quam foliis brevioribus, inferioribus plurime tantum 5–12 mm. longis. Folia opposita, parce petiolata petiolis planis circ. 4 vel 5 mm. longis, omnino circ. 2.7–4 cm. longa et 1.1–1.7 cm. lata, indivisa, anguste oblongo-ovata, marginibus regulariter acriterque serrata dentibus indurato-apiculatis, apicaliter subacuminata. Capitula non numerosa (6 in unico specimine observata), corymboso-paniculata pedicellis 1–7 cm. longis, radiata, pansa ad anthesin ±2.8 cm. lata et circ. 7–8 mm. alta. Involucri externe hispidi bracteae exteriores 8–16, lineares, inferne saepe sensim angustatae, apice acriter indurato-mucronatae, demum circ. 6–8 mm. longae; interiores lanceolatae ventraliter nitidae et non nisi ad summam hispidae, paulo vel fere dimidio longiores. Flores ligulati circ. 10, saturate flavi, ligula elliptico-oblongi, apice bidenticulati, circ. 1.2–1.4 cm. longi. Paleae nitido-stramineae, lineari-oblongae, apice subabrupte mucronatae, nervo mediano perspicuae, achaenia superantes. Achaenia valde obcompressa, nigra, lineari-oblonga, utraque facie circ. 8-striata, faciebus marginibusque adpresse erecto-setosa, non vere alata, corpore 4–5 mm. longa et circ. 1 mm. lata, apice erecte setoso biaristata aristis tenuibus antrorsum hispidis circ. 1–1.5 mm. longis.

Type specimen: Collected by *Oscar Neumann*, No. 135, at altitude of 2,800 meters in mountain meadows, Gardulla, near and south-southwest of Lake Abaya (L. Abai), southwestern Abyssinia, January 14, 1901 (Berl.).

Distribution: Known only from type locality in southwestern Abyssinia.

Specimens examined: *Neumann* 135 (type, Berl.).

EXPLANATION OF PLATE CLXXXVI

Bidens Neumannii: a, flowering and fruiting specimen, ×0.64; *b*, exterior involucral bract, ×5.12; *c*, interior involucral bract, ×5.12; *d*, ray corolla, ×3.84; *e*, palea, ×5.12; *f*, disc floret, ×6.4; *g*, achene, ×5.12; all from type.

229. **Bidens ternata** (Chiov.) Sherff, Bot. Gaz. 90: 391. 1930.
Pl. CLXXXVII.

Coreopsis ternata Chiov. Ann. Bot. Roma 9: 74. 1911.

Herba perennis, glaberrima, circ. 9 dm. alta, caulibus caespitosis, strictis, subteretibus. Folia 3-verticillata, subsessilia, 7–11 cm. longa et 2–3.5 cm. lata, ovato-lanceolata, basi ample et breviter cuneata, apice acuta vel etiam tenuiter acuminata, marginibus scaberrimis argute serrata dentibus acutissimis calloso-acuminatis vel interdum etiam in setas subspinulosas desinentibus, venulis parce scabrula, supra subviridia subtus pallidiora, internodia duplo triplove superantia et caulibus subadpressa. Capitula subcorymbosa, circ. 11 in caule quoque, subrigide pedunculata pedunculis plerumque 4–7 cm. longis, radiata, pansa ad anthesin ±5 cm. lata et ±9 mm. alta. Involucri bracteae subaequales, exteriores circ. 18–22, lineares, plus minusve patentes, acriter subcalloso-apiculatae, dorso glabrae, marginibus scabro-ciliatae, 9–14 mm. longae; interiores sub 12 lanceolatae, dorso dense pilis basi eximie incrassatis obtectae, acutae, in medio late rubro-vittatae, marginibus luteolis pallidae. Flores ligulati verisimiliter circ. 10–12, flavi, ligula lineares, apicaliter saepe denticulati, circ. 1.5–2 cm. longi. Paleae pallide hyalinae, ad medium linea colorata percursae, apice abrupte acutae, demum circ. 7 mm. longae. Disci florum corollae apice 5-dentatae dentibus perspicuissime papilloso-hispidis; stigmatibus anguste caudatis. Achaenia lineari-oblonga, obcompressa, exalata, nigra, utraque facie circ. 8-sulcata, faciebus (praecipue superne) marginibusque erecto-setosa, corpore 5–5.5 mm. longa et 1.1–1.3 mm. lata, apice erecto-setosa ac biaristata aristis filiformibus antrorsum hispidis circ. 1.4–1.8 mm. longis.

Type specimen: Collected by *Emilio Chiovenda*, No. 2581, very rare in the Valley of Scintà above Asosò, Dembià, Province of Amhara, Abyssinia, October 17, 1909 (Flor.).

Distribution: Known only from type locality in Abyssinia.

Specimens examined: *Chiovenda* 2581 (type, Flor.).

EXPLANATION OF PLATE CLXXXVII

Bidens ternata: a, fruiting specimen, ×0.61; *b*, exterior involucral bract, ×2.44; *c*, interior involucral bract, ×2.44; *d*, ray corolla, ×2.44; *e*, palea, ×2.44; *f*, disc floret, ×4.88; *g*, achene, ×4.88; all from type.

230. **Bidens setigera** (Schz. Bip.) Sherff, Bot. Gaz. 90: 390. 1930. Pl. CLXXXVIII, figs. *j* and *k*.

Coreopsis setigera Schz. Bip. in Walp. Repert. 6: 163. 1846.

Verbesina lineata A. Richard, Tent. Fl. Abyssin. 1: 410. 1847.

Coreopsis abyssinica var. *bipinnato-partita* Chiov. in Pirotta, Fl. Eritr. 185. 1904 (fide Adr. Fiori, Nuov. Giorn. Bot. Ital. n. ser. 20: 390. 1913).

Folia pinnatim plus minusve incisa vel etiam subtripartita. var. *β. lobata.*

Folia 2–3-pinnatisecta.

Achaenia biaristata ..... *B. setigera* sensu stricto.

Achaenia exaristata, pappo plus minusve cupuliformi. var. *γ. abyssinica.*

Herba annua, erecta, verisimiliter usque ad 1 m. alta, paniculato-corymbosa, glabra vel superne hirta. Folia opposita, tenuiter petiolata petiolis plus minusve hispidis basaliter connatis usque ad 2 cm. longis, petiolo adjecto 3–6 cm. longa, pinnatisecta pinnis pinnatipartitis membranaceis, lobis vel dentibus oblongo-linearibus plus minusve hirtis punctulis atris obsitis acerrime calloso-apiculatis et saepissime seta longiore terminatis. Capitula parva tenuissime pedicellata pedicellis hispidis ±3 cm. longis, radiata, pansa ad anthesin ±1.5 cm. lata et circ. 4–5 mm. alta. Involucri bracteae exteriores circ. 8, lineari-spathulatae (infra angustissimae apicem versus oblongo-orbiculatae), acriter calloso-apiculatae, glabratae, 3–4 mm. longae; interiores ovato-acutae marginaliter diaphanae alibi brunneae pubescentes saepe dimidio longiores. Flores ligulati circ. 8, flavi, saepe pistillati, ligula anguste oblongi, apice integri, ±7 mm. longi et ±1 mm. lati. Paleae lineari-oblongae, circ. 3-striatae, valde nitidae, circ. 5–6 mm. longae. Achaenia minima, lineari-oblonga, nigra, valde obcompressa, dorso convexiuscula ventre plana, omnino papillis in setas erectas adpressas desinentibus obsita, exalata, utraque facie circ. 4-sulcata, corpore tantum circ. 2.5 mm. longa et circ. 0.8 mm. lata, apice stramineo erecto-setosa ac biaristata aristis tenuissimis erectis stramineis antrorsum hispidis fere 2 mm. longis.

Type specimen: Collected by *Eduard Rüppell* in Abyssinia in 1831 or 1832 (Par.).[1]

Distribution: Abyssinia and probably Eritrea.

Specimens examined: *Rüppell*, Abyssinia, 1831 or 1832 (type, Par.).[2]

Bidens setigera var. *β.* **lobata** Sherff, Bot. Gaz. 91: 311. 1931.

Folia circumambitu oblongo-lanceolata vel anguste deltoideo-lanceolata, pinnatim plus minusve incisa vel etiam subtripartita, inferiora non visa alia 2–5 cm. longa, dentibus perspicue setigeris.

[1] The type sheet in Schultz Bipontinus' herbarium at Paris has a small plant at the right, with one fruiting and two flowering heads. This has the Rüppell label underneath. At the left is a small fragment from a larger but specifically identical plant, with one fruiting head and the several leaves more compound and more noticeably setigerous-toothed. As no additional field data are given under this second specimen, it may well be that the two belonged to the same collection.

[2] Formerly I made no distinction of the var. *abyssinica* from *B. setigera* proper when compiling my manuscript. The following additional specimens were listed and doubtless many of them belong to var. *abyssinica: Anon.* 235, Hort. Berol. e sem. Schimperi abyssin., 1857 (Herb. Par.; forma bracteis ext. quam int. longior.); *A. Braun*, Hort. Carlsruh., 1841 (Herb. Par.); *Emilio Chiovenda* 2051, Gondar, Dembià, Prov. Amhara, Abyssinia, September 13, 1909 (Flor.); *idem* 2699, Dembià, October 27, 1909 (Flor.); *idem* 2750, Gondar (Flor.); *idem* 3253, Scire, Tigre, Abyssinia, December 11, 1909 (Flor.); *Adriano Fiori* 1828, alt. 960 meters, Ghinda, Hamasen (Amasen) region, Eritrea, April 11, 1909 (Flor.); *idem* 1830, alt. 1,950 meters, Hamasen region, February 3, 1909 (Flor.); *idem* 1929, cult. e sem. lectis alt. 960 m. ad Ghindam, October 2, 1909 (Flor.); *Hort. Cantabrig.* (*Harvard Univ.*), cult. e sem: ex Hort. Petropol. missis, July 8, 1895 (Gray) and August 7, 1895 (Gray, 2 sheets; forma elata achaeniorum corporibus usque ad 4.5 mm. aristis usque ad 3 mm. longis); *A. Pappi* 559, alt. about 2,000 meters, Adi Quala, Sarae, Eritrea, October 23, 1902 (Flor.); *idem* 584, alt. about 1,900 meters, Terammi, Sarae, October 9, 1902 (Flor.); *idem* 3047, alt. 500 meters, Cuale-Enrot, Eritrea, March 18, 1893 (Flor.); *idem* 3097, alt. about 1,000 meters, Mt. Fatta, Eritrea, March 19, 1893 (Flor.); *idem* 3128, alt. about 1,000 meters, Eritrea, March 19, 1893 (Flor.); *idem* 3191, alt. about 1,200 meters, Eritrea, March 20, 1893 (Flor.); *idem* 3871, Hamasen region, Eritrea, March 2–10, 1902 (Flor.); *idem* 4101, alt. about 600 meters, Valle Damas, Ocule Cusai, Eritrea, April 14, 1893 (Flor.); *idem* 4209, Dongollo near Ghinda, Hamasen region, Eritrea, March 12, 1902 (Flor.); *idem* 4268, eodem loco et temp. (Flor.); *idem* 5787, alt. about 1,200–1,800 meters, Mt. Dijet, Eritrea, March 2, 1902 (Flor.); *V. Ragazzi* 244, alt. 1,500 meters, Eritrea, September, 1892 (Flor.); *idem* 3360/3860, Scioa, Abyssinia, Oct. 10, 1886 (Flor.); *G. Schweinfurth & D. Riva* 2119, alt. 950 meters, higher places at Donkollo (Dongollo) near Ghinda, Eritrea, May 14, 1892 (Flor.); *Sing Scotti*, Ghinda, 1893 (Flor.); *A. Tellini* 135, Ghinda, December 1–2, 1902 (Herb. Flor.); *idem* 586, eodem loco et tempore (Flor.); *idem* 1189, Eritrea, October 11–13, 1902 (Flor.); *idem* 1512, Eritrea, January–February, 1903 (Flor.); *idem* 1586, Mai Atal-Dongollo, Eritrea, February, 1903 (Flor.); *idem* 1683, near Dongollo, Eritrea, February–March, 1903 (Flor.); *idem* 1715, eodem loco et temp. (Flor.); *A. Terraciano & A. Pappi*, Eritrea, April 3, 1892 (Flor.); *iidem* 55, alt. about 1,000 meters, Baresa, Ghinda, Eritrea, February 17, 1893 (Flor.); *iidem* 760, alt. about 1,800–2,060 meters, "Rora Ualicaue-Ham-Ham," Eritrea, January 9, 1893 (Flor.); *iidem* 1441, alt. about 2,400 meters, Mt. Ira, Eritrea, February 9, 1893 (Flor.); *iidem* 1981, alt. 1,900 meters, Eritrea, January 8, 1893 (Flor.).

BIDENS SETIGEROIDES Sherff (figs. *a–i*)
BIDENS PHELLOPTERA Sherff (figs. *j–s*)

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Type specimen: Cultivated in garden of *J. Veitch and Sons*, 1908, from material collected by *Captain Diespecker* in British East Africa (Kew, 2 sheets).

Distribution: British East Africa.

Specimens examined: *Hort. Veitchii et filiorum* (Kew, 2 type sheets).

The first type sheet has the six flowering heads measuring about 2.2–2.7 cm. across, with about 12–16 exterior bracts. The second type sheet has likewise six flowering heads, but these are mostly 4–4.5 cm. across and the exterior bracts number 16–22. These differences are construed as representing different states of luxuriance due to conditions of cultivation.

Bidens setigera var. γ. **abyssinica** (Schz. Bip.) Sherff, Bot. Gaz. 92: 202. 1931. Pl. CLXXXVIII, figs. *a–i*.

Chrysanthellum (subgenus *Microlecane*) *abyssinicum* Schz. Bip. Flora 25: 440. 1842; Walp. Repert. 6: 171. 1846.

Microlecane abyssinica (Schz. Bip.) Benth. & Hook. ex O. Hoffm. in Engler & Prantl, Pflanzenfam. 4, 5: 240, *fig. 118C*. 1894.

E specie achaeniis exaristatis sed pappo brevi plus minusve consolidato ac cupuliformi coronatis differt.

Type specimen: Collected by *Wilhelm Schimper*, No. 766, at margins of groves in valleys near Adoa, Abyssinia, November 12, 1838 (Par., 2 sheets).[1]

Distribution: Abyssinia and perhaps Eritrea.

Specimens examined: *Schimper* 766 (2 type sheets).[2]

The achenes of this variety lack aristae but have the pappus more or less definitely coroniform or cup-shaped (whence the name *Microlecane* given by Schultz Bipontinus). Tegetmeyer (O. Hoffm. loc. cit.) has illustrated this peculiar pappus in its extreme development.

In his original treatment Schultz Bipontinus referred this form, as representing a subgenus, to *Chrysanthellum*. The affinity with

[1] The two type sheets of *Chrysanthellum abyssinicum* at Paris both bear the number 578. A printed distribution label also is present on the first type sheet and this has the number 766 in print with the citation "Fl. Ratisb. Anni. 1842 pag. 440, ubi per errorem plantae numerus 578 tribuitur." In his original description Schultz Bipontinus gave Schimper's number as "it. abyss. Sect. II. no. 578," but later, in Walpers' *Repertorium*, he gave it as "1078." Just why these discrepancies arose is not clear, but there can be no question as to the authenticity and identity of the type material.

[2] See footnote (p. 628, no. 2) under species proper.

that genus seems purely fallacious. Bentham and Hooker (loc. cit.) elevated the subgenus, which Schultz Bipontinus had named *Microlecane*, to the rank of a genus separate from *Chrysanthellum*. However, through *Bidens setigera* and *B. setigeroides* the type material of *Microlecane* is too closely allied with *Bidens* to justify generic segregation. Thus, for example, *B. setigera* has very long, slender aristae and many of the achenes are much the same as in other species of *Bidens* (sect. *Steppia*); but a fair percentage of them have the shorter or secondary pappus noticeably modified into an annular or cupuliform corona (not shown in my illustration), thus strongly suggesting the so-called *Microlecane* material, here treated as the var. *abyssinica*. All things considered, it seems that the var. *abyssinica* bears somewhat (though not entirely) the same relationship to *B. setigera* proper that *Bidens aristosa* var. *mutica* bears to the species *B. aristosa* proper.

EXPLANATION OF PLATE CLXXXVIII

Bidens setigera, figs. *j*, *k:* achenes, ×6.84; from type.

Bidens setigera var. *abyssinica*, figs. *a–i: a*, flowering and fruiting branch, ×0.57; *b* (lower), *c* (upper), leaves, ×0.57; *d*, exterior involucral bract, ×4.56; *e*, interior involucral bract, ×4.56; *f*, ray corolla, ×2.85; *g*, palea, ×4.56; *h*, disc floret, ×4.56; *i*, achene, ×6.84; *a*, *d–i*, from type; *b*, from *Pappi* 3047, in Hb. Flor.; *c*, from *Terraciano* and *Pappi* 2003, *ibid.*

231. **Bidens setigeroides** Sherff, Bot. Gaz. 91: 310. 1931. Pl. CLXXXIX, figs. *a–i*.

Herba annua, erecta, laxe hispida, caule subtetragona, ramosa ramis suberectis, 3–9 dm. alta. Folia 2–3-pinnatisecta, breviter petiolata petiolis latis usque ad 1 cm. longis, petiolo adjecto usque ad circ. 7 cm. longa; segmentis membranaceis, acriter apiculatis et interdum in setas breves desinentibus, plerumque 1–2 mm. latis. Capitula subcorymboidea, tenuissime pedicellata pedicellis pubescentibus 2–6 cm. longis, numerosa, radiata, pansa ad anthesin ±1.2 cm. lata et circ. 6 mm. alta, demum circ. 8–9 mm. diametro. Involucri bracteae plus minusve hispidae, exteriores plerumque 6, anguste lineares vel lineari-spathulatae, apicaliter obtusae, 2–3 mm. longae; interiores oblongo-ovatae, ±3.5 mm. longae. Flores ligulati circ. 6, flavi, ligula oblongo-ovati, apice circ. 3-dentati, circ. 5–6 mm. longi. Paleae nitidae, glabrae, oblongae, subobtusae, apicem versus aurantiacae, 3–6 mm. longae. Achaenia oblanceolato-linearia vel late oblanceolata, nigra, exalata, non manifeste sulcata, dorso con-

vexa ac glaberrima, ventre plana vel concava ac costa mediana erecte setosa, marginibus erecte ciliata, apice truncato exaristata sed erecte setosa, 2.2–3.5 mm. longa et 0.5–1.2 mm. lata.

Type specimen: Collected by *J. D. Snowden*, No. 411, growing 1 to 3 feet high in short-grass land at altitude of 1,500 meters, Wallasi, Bukedi, Uganda Protectorate, British East Africa, October 17, 1916 (Kew).

Distribution: Known only from type locality in Uganda.

Specimens examined: *Snowden* 411 (type, Kew).

Differs from *Bidens setigera* in the less setigerous foliar teeth, the fewer exterior bracts of the involucres, the smoother and more shiny achenes, these exaristate and lacking a consolidated cupuliform pappus or corona at apex, etc. It approaches in general appearance the habitally similar *Coreopsis Negriana* Sherff of Gallaland, but differs from that in the smaller flowering heads, the setose, exalate achenes, etc.

EXPLANATION OF PLATE CLXXXIX, FIGS. *a–i*

Bidens setigeroides: a, flowering and fruiting branch, ×0.66; *b*, exterior involucral bract, ×6.6; *c*, interior involucral bract, ×6.6; *d*, ray floret, ×5.94; *e*, palea, ×6.6; *f*, disc floret, ×9.9; *g*, outer achene, ventral face, ×6.6; *h* (dorsal), *i* (ventral), faces of inner achene, ×6.6; all from type.

232. **Bidens phelloptera** Sherff, Bot. Gaz. 92: 204. 1931. Pl. CLXXXIX, figs. *j–s*.

Herba verisimiliter perennis, usque ad 2 m. alta, caule obscure angulato glabro. Folia secundaria (primaria non visa) tenuiter petiolata petiolis ±1.5 cm. longis petiolo adjecto ±4.5 cm. longa, pinnatim 3–5-partita; segmentis valde membranaceis, ovatis vel lanceolatis, apice acutis, supra glabratis subtus pubescentibus, circ. 6–13 mm. latis, acerrime dentatis dentibus mucronatis. Capitula corymbose disposita, ramulos plerumque glabros usque ad 8.5 cm. longos terminantia, radiata, pansa ad anthesin ±4 cm. lata et circ. 10–11 mm. alta. Involucri glabri bracteae exteriores 8–10, lanceolatae vel lineari-oblongae, apice obtusae, mox valde reflexae; interiores late oblongo-lanceolatae, basaliter vel etiam usque ad medium connatae, demum circ. 8.5–9.5 mm. longae. Paleae late lineari-oblongae, apicaliter obtusae atque atro-coloratae, 7–9.5 mm. longae. Flores ligulati ±6 (normaliter 8?), flavi, ligula anguste obovati, apice minute acriterque 3–4-denticulati, 1.7–2 cm. longi. Achaenia

valde obcompressa, utraque facie subatra 8-sulcata glabra vel apicem versus erecte setosa, marginibus crassiusculis densissime erecto-ciliata, exteriora late oblonga 5–6 mm. longa et marginibus perspicuis incrassatis inclusis 2–2.4 mm. lata apicaliter calva vel breviter biaristata et saepe paucisetosa, interiora lineari-oblonga corpore circ. 8–9 mm. longa et marginibus angustis inclusis circ. 1.5–1.8 mm. lata, apice plus minusve setoso biaristata; aristis tenuibus usque ad 2.5 mm. longis, nunc glabris nunc antrorsum vel etiam retrorsum 1–2-hamosis.

Type specimen: Collected by *Walter Busse*, No. 2257, at altitude of 750 meters, south slope of Mt. Gonja, Usambara, German East Africa, April 18, 1903 (Berl.).

Distribution: Known only from type locality in German East Africa.

Specimens examined: *Busse* 2257 (type, Berl.).

The branches of the type material have internodes 1–1.5 dm. long. Busse's label lists the plant as an herb and gives its height as being up to 2 meters. The interior involucral bracts (like those of *Bidens praecox*) are connate below, often even up to the middle, thus simulating those of the allied genus *Thelesperma*, although the general habit in no way suggests *Thelesperma*. The achenes are thick-margined and suggest those of some species of *Coreopsis*, but the occasional retrorse barbs are foreign to that genus.

EXPLANATION OF PLATE CLXXXIX, FIGS. *j–s*

Bidens phelloptera: j, k, rameal leaves, ×0.66; *l,* exterior involucral bract, ×3.3; *m,* portion of interior involucre, showing submedianly connate bracts, ×2.7; *n,* ray corolla, ×2; *o,* palea, ×5.28; *p, q,* disc florets, ×5.28; *r, s,* achenes, ×5.28; all from type.

233. **Bidens praecox** Sherff, Bot. Gaz. 92: 450. 1931.
Pl. CLXXXVIII, fig. *l.*

Herba erecta, gracilis, glabra, erecte ramosa, circ. 6 dm. alta, caule plus minusve tetragona. Folia tenuiter petiolata petiolis saepe albido-hispidis ±1 cm. longis, petiolo adjecto 4–7 cm. longa, 1–2-pinnata; segmentis ultimis valde membranaceis, nunc ovatis nunc rhomboideo-oblongis, breviter rotundo-dentatis et apicaliter rotundatis sed obsolete mucronulatis, acriter ciliatis, circ. 4–12 mm. latis. Capitula verisimiliter discoidea, ramulos (pedunculos) acriter angulatos glabratos vel irregulariter hispidos usque ad circ. 8 cm. longos terminantia, ad anthesin minuta (verisimiliter circ. 5 mm.

alta et circ. 4 mm. lata). Involucri glabri bracteae exteriores circ. 8, tergo 3-nervatae, sursum sensim dilatatae, apicaliter subito rotundatae et obtusae vel rarius subacutae, eciliatae, demum etiam usque ad 4 mm. longae; interiores oblongo-lanceolatae apicaliter angustatae ac pulverulente pubescentes, inferne connatae, demum circ. 8–9 mm. longae. Achaenia praecocia, tenuiter clavato-linearia, obcompressa vel plana, deorsum sensim angustata, plumbeo-atra, glabra vel tuberculato-papillata, utraque facie nunc eleganter circ. 8-sulculata nunc subobsolete circ. 4-sulcata, 6–7.5 mm. longa et circ. 0.8–1.1 mm. lata, marginibus exalata, apice exaristata sed plus minusve incrassato-capitata vel crassiusculo-anulata, itaque sub apice plerumque plus minusve constricta, demum paleas oblongo-lineares hyalinas apicem acutum versus sensim angustatas dimidio superantia.

Type specimen: Collected by *Walter Busse*, No. 2523, in sandy soil, sunny places in legume forest, Mayanga, District of Lindi, southeasternmost German East Africa, May 15, 1903 (Berl.).

Distribution: Known only from type locality in German East Africa.

Specimens examined: *Busse* 2523 (type, Berl.).

Florets, both ray and disc, are lacking on the type. The achenes had been well formed even on small, young heads, differing in this respect from those in ordinary species of *Bidens*. Moreover, the achenes had produced at the apex some sort of secondary growth, this imparting a more or less capitate appearance. The growth in question is mostly 0.5–0.8 as wide as the maximum width of the achenial body and is variously truncate or protuberant, ovoid or subglobose, sometimes appearing faintly as if representing a remnant of the disc floret. The general habit is that of many annual species of *Bidens* (unless as to the submedianly connate interior involucral bracts, which, however, are matched by those in *B. phelloptera*), to which genus the species is apparently best referred for the present.

EXPLANATION OF PLATE CLXXXVIII, FIG. *l*

Bidens praecox: achene, ×3.42; from type.

NOMINA E BIDENTE EXCLUDENDA

Bidens acaulis Baker in Mart. Fl. Bras. 6, pt. 3: 247. 1884 (cf. Sherff, Bot. Gaz. 81: 245. 1926). = *Isostigma acaule* (Baker) Chod. Bull. Herb. Boiss. II. 1: 417. 1901.

Bidens Acmella (L.) Lam. Encycl. 1: 415. 1783. = *Spilanthes Acmella* (L.) Murr. Syst. Veg. ed. 13. 610. 1774 (cf. A. H. Moore, Proc. Amer. Acad. 42: 534. 1907).

Bidens Acmelloides Berg. in Vet. Acad. Handl. 29, pt. 2: 245, *pl. 7, fig. 1.* 1768. = *Spilanthes oleracea* L. Syst. Nat. ed. 12. 2: 534. 1767 (cf. A. H. Moore, op. cit. 530).

Bidens angustifolia Lam. Encycl. 1: 416. 1783. = *Spilanthes urens* Jacq. Enum. Pl. Carib. 28. 1762 (cf. Lam. loc. cit.; cf. A. H. Moore, op. cit. 528).

Bidens angustifolia Lam. var. *minor* Poir. in Lam.-Poir. Illustr. Gen. 3: 244. *pl. 668, fig. 2.* 1823. = *Spilanthes urens* Jacq. loc. cit. (cf. A. H. Moore, op. cit. 528).

Bidens Apiifolia L. Syst. Nat. ed. 10. 2: 1203. 1759; Amoen. Acad. 5: 381, 405. 1760. = *Chrysanthellum americanum* Vatke, Abh. Bremen 9: 122. 1885 (cf. O. E. Schulz in Urban, Symb. Antill. 7: 144. 1911).

Bidens arborea (Forst. & Forst. *f.*) Roxb. in A. Beatson, Appendix (Tracts Isl. St. Helena) 301, 325. 1816. = *Laxmannia arborea* Forst. & Forst. *f.* Char. Gen. 94. *pl. 47.* 1776 (cf. Robinson, Proc. Amer. Acad. 47: 207. 1911).

Bidens Artemisiaefolia (Jacq.) O. Ktze. Rev. Gen. 1: 321. 1891. = *Cosmos sulphureus* Cav. Icon. et Descr. Pl. 1: 56. *pl. 79.* 1791.

Bidens Artemisiaefolia (Jacq.) O. Ktze. subsp. *caudata* (H.B.K.) O. Ktze.[1] var. *fusca* O. Ktze. (ex patria et radii colore) et verisimiliter etiam var. *rubra* O. Ktze.; subsp. *intermedia* O. Ktze. cum var. *aurantiaca* O. Ktze.; subsp. *calva* (Schz. Bip.) O. Ktze. var. *sulfurea* (Cav.) O. Ktze.[2] (ex syn. Cav.) loc. cit. = *Cosmos sulphureus* Cav. loc. cit.

Bidens Artemisiaefolia (Jacq.) O. Ktze. subsp. *calva* (Schz. Bip.) O. Ktze. loc. cit. = *Cosmos calvus* (Schz. Bip.) Sherff, Field Mus. Bot. 8: 405. 1932.

Bidens Artemisiaefolia (Jacq.) O. Ktze. subsp *caudata* (H.B.K.) O. Ktze. cum. var. *rosea* O. Ktze. loc. cit. = *Cosmos caudatus* H.B.K. Nov. Gen. et Sp. 4: 188 (240). 1820.

[1] In this and the next two following cases, it may be noted that Kuntze omitted mention of any status for the names *caudata, intermedia,* and *calva,* but his placing of varieties under them would seem to indicate his conception of them as being subspecies.

[2] Spelled *sulphureus* by Cavanilles, loc. cit.

Bidens Artemisiaefolia f. *grandiflora* O. Ktze. and f. *parviflora* O. Ktze. loc. cit. = *Cosmos sulphureus* Cav.[1] loc. cit.

Bidens Atriplicifolia L. Cent. 2: 30. 1756; Amoen. Acad. 4: 329. 1759 = *Isocarpha Atriplicifolia* (L.) R. Br. Trans. Linn. Soc. 12: 110. 1816.

Bidens atropurpurea DeVries, Sp. and Var. 131. 1905 (nomen). Cf. *Coreopsis tinctoria* Nutt. Journ. Acad. Phila. 2: 114. 1821.

Bidens atrosanguinea (Hook.) Ortg. in Regel, Gartenflora 1861: 408. *pl. 347.* 1861; cf. Vilmorin, Fl. Pl. Terre ed. 2. 269. 1866.= *Cosmos atrosanguineus* (Hook.) Ortg. loc. cit. Specimens raised in Vienna in 1868 (e sem. ex Hort. Turic. anno 1867) are still preserved (Mus. V., U.V.). In the Botanical Garden of Harvard University this plant has been raised for many years, doubtless since the days of Hooker and Ortgies (one of whom probably sent Asa Gray some of the original seed). The living plants were studied there in August, 1929. The plants bear heads uniformly dark-flowered, the rays of a velvety blackish red.

Bidens atrosanguinea var. *hybrida* DeCorte, Rev. Hort. Belge 37: 29 et *fig.* 1911 = Hybrid between *Cosmos atrosanguineus* (Hook.) Ortg. and *Dahlia Merckii* Lehm.

Bidens? bandana Wall. Cat. 3291, Comp. No. 401.[2] = *Chrysanthellum indicum* DC. Prodr. 5: 631. 1836.

Bidens Beckii Torr. in Spreng. Neue Entdeck. 2: 135. 1821; Fl. N. Y. 1: 388. *pl. 58.* 1843. = *Megalodonta Beckii* (Torr.) Greene, Pittonia 4: 271. 1901. Rejected from *Bidens* not alone because of its growth habit, but also and mainly because of its achenial characters.[3]

Bidens Beckii f. *scissa* Sheldon, Bull. Geol. Nat. Hist. Surv. Minn. 9: 79. 1894. = *Megalodonta Beckii* (Torr.) Greene, loc. cit. Type herbarium not named, but a fine sheet of the type collection (from Lindstrom, Minnesota) is extant (U.S.).

Bidens Berteriana Spreng. Syst. 3: 454. 1826. = *Cosmos caudatus* H.B.K. Nov. Gen. et Sp. 4: 188 (240). 1820. DeCandolle's Pro-

[1] Kuntze (loc. cit.) proposed his two forms in a rather loose way, manifestly intending that they might be distinguished in the case of all subspecies and varieties of his *Bidens Artemisiaefolia* (that is to say, for each subspecies and variety both a forma *grandiflora* and a f. *parviflora* could be distinguished.

[2] Wallich's Catalogue is written indistinctly as to the *r's* and *n's*. The *Index Kewensis* (1: 300. 1895) prints the trivial name *bardana* and Hooker (Fl. Brit. Ind. 3: 310. 1885) renders it *bandanna.*

[3] Wiegand and Eames (Fl. Cayuga Lake Basin 418. 1925) insist upon the retention of this species in *Bidens.*

dromus Herbarium (Del.) has an excellent flowering and fruiting specimen. The rays are a faded rose color. The label reads, "*Bidens Berteriana* Spr. *Coreopsis coronata* Bert. Porto Rico Bertero M. Balbis 1820." Balbis sent many specimens this way to DeCandolle and this material by Bertero would seem to be authentic (Sprengel's *Bidens Berteriana* having been founded upon *Coreopsis coronata* Bert.).[1]

Bidens bipinnata Baill. Hist. Pl. 8: 50. 1886 (non L.).=*Cosmos bipinnatus* Cav. Icon. et Descr. Pl. 1: 10, *pl. 14*. 1791.

Bidens calva (Schz. Bip.) C. B. Clarke, Comp. Ind. 141. 1876. =*Cosmos calvus* (Schz. Bip.) Sherff, Field Mus. Bot. 8: 405. 1932.

Bidens carnea Heer, Ind. Sem. Hort. Turic. 1842.[2]=*Cosmos caudatus* H.B.K. Nov. Gen. et Sp. 4: 188 (240). 1820.

Bidens caroliniana Hemsl. in Index Curtis's Bot. Mag. 27. 1906.= *Coreopsis lanceolata* L. Sp. Pl. 908. 1753.

Bidens Carvifolia (Benth.) Schz. Bip. in Seemann, Bot. Voy. Herald 308. 1852–1857.=*Cosmos Carvifolius* Benth. Bot. Voy. Sulph. 117. 1844.

Bidens caudata (H.B.K.) Schz. Bip. in Seemann, loc. cit.= *Cosmos caudatus* H.B.K. Nov. Gen. et Sp. 4: 188 (240). 1820.

Bidens Cervantesii (Lag.) Baill. ex Ind. Kew. 1: 300. 1895.[3] =*Dahlia coccinea* Cav. Icon. et Descr. Pl. 3: 33, *pl. 266*. 1795 (fide Ind. Kew. 1: 300. 1895).

Bidens coccinea (Cav.) Baill. op. cit. 49, *figs. 73, 74*.=*Dahlia coccinea* Cav.[4] loc. cit.

Bidens coronata (Hook.) Fisch. ex Steud. Nom. ed. 2. 1: 202. 1840.=*Coreopsis nuecensis* Heller, Bot. Expl. S. Texas 106. 1895.

[1] Other students appear unanimously to have referred Sprengel's species to *Cosmos caudatus*, among them: Steudel, Nom. Bot. ed. 2. 202. 1840; Baker in Mart. Fl. Bras. 6, pt. 3: 242. 1884; O. E. Schulz in Urban, Symb. Antill. 7: 144. 1911; Urban, op. cit. 4: 641. 1911; Gómez, Anal. Hist. Nat. Madr. 275. 1890; etc.

[2] *Bidens carnea* Heer is the customary citation, but an early and apparently original specimen by Regel (Berl.) is accompanied with the inscription "*Bidens carnea* Heer et Rgl."

[3] Baillon, cited by the *Index Kewensis*, really gave (Hist. Pl. 8: 305. 1886) the name *Dahlia Cervantesii* Lag. (cf. DC. Prodr. 5: 494. 1836). While he treated *Dahlia* as a section of *Bidens* (op. cit. 221, footnote 8; 305, footnote 8), he really did not directly make a new combination.

[4] So also *B. coccinea* (Cav.) Gómez (Anal. Hist. Nat. Madr. 19: 275. 1890). =*Dahlia coccinea* Cav.

Bidens crocata Cav. Icon. et Descr. Pl. 1: 66, *pl. 99.* 1791.= *Verbesina crocata* (Cav.) Less. ex DC. Prodr. 5: 617. 1836 (cf. A. H. Moore, Proc. Amer. Acad. 42: 560. 1907).[1]

Bidens Dahlioides Wats. Proc. Amer. Acad. 26: 142. 1891.= *Cosmos diversifolius* Otto in Knowles & Westc. Fl. Cab. 2: 3, *pl. 47.* 1838 (cf. Sherff, Bot. Gaz. 56: 494. 1913).

Bidens denudata Turcz. Bull. Soc. Nat. Mosc. 24: 183. 1851. =*Glossogyne tenuifolia* (LaBillard.) Cass. Dict. Nat. Sci. 51: 475. 1827.[2]

Bidens dichotoma Desf. Tabl. Ecol. Bot. ed. 1. 108. 1804.= Nomen nudum.[3]

Bidens diversifolia (Otto) Schz. Bip. in Seemann, Bot. Voy. Herald 308. 1852–1857; etiam *B. diversifolia* (Otto) Ortg. in Regel, Gartenflora 408. 1861.=*Cosmos diversifolius* Otto in Knowles & Westc. Fl. Cab. 2: 3. *pl. 47.* 1838. (*B. diversifolia* var. *atrosanguinea* Hook. in Curtis's Mag. 87: pl. 5227. 1861=*B. atrosanguinea* [Hook.] Ortg. q. v., p. 635.)

Bidens fervida Lam. Encycl. 1: 415. 1783.=*Spilanthes oleracea* L. fide Lam. ips. atque A. H. Moorei, Proc. Amer. Acad. 42: 530. 1907.

Bidens fixa Hook. f. Fl. Brit. Ind. 3: 307. 1885. Sphalm, for *B. fusca* (cf. Ind. Kew. 1: 301. 1895).=*Spilanthes oleracea* L. (cf. Spreng. Syst. Veg. 3: 444. 1826; etiam A. H. Moore, loc. cit.).

[1] DeCandolle (loc. cit.), the *Index Kewensis* (4: 1180. 1895), A. H. Moore (loc. cit.), and various other authorities give Lessing for the combination *Verbesina crocata*, but Lessing (Syn. Gen. Comp. 232. 1832) did not make a definite or decisive transfer from *Bidens* to *Verbesina*. Nor should we overlook the fact that in his index (op. cit. 445) Lessing retained *Bidens crocata* Cav. but entirely omitted (op. cit. 472) mention of any *Verbesina crocata*.

[2] Fide Ind. Kew. 1: 300. 1895. The type of *B. denudata* Turcz. was collected by Cuming (No. 1375)in the Province of Cagagan, Luzon, Philippine Isls. I do not recall having seen it.

[3] Desfontaines gave merely a name for his plant and indicated it to be a perennial. DeCandolle (Prodr. 5: 597. 1836) presented a description, citing plants from Brazil by Commerson and by Lund. Lund's one plant (Del.) studied is true *B. pilosa* L. The Prodromus Herbarium (Del.) appears to have no specimens by Commerson. All told, the Prodromus specimens of "*B. dichotoma* Desf." are five in number, four being true *B. pilosa* L. and one being *B. pilosa* var. *minor* (Bl.) Sherff (cf. Chodat, Bull. Herb. Boiss. 2. 2: 394. 1902).

Desfontaines later published (Cat. Pl. Hort. Reg. Paris ed. 3. 185. 1829) "*Bidens dichotoma* H. p." as a synonym for *Blainvillea rhomboidea* Cass. Dict. Nat. Sci. 29: 494. 1823. (Cf. O. E. Schulz, Bot. Jahrb. 50, Suppl. 182. 1914). A small but fine specimen of a "*Bidens dichotoma*" is preserved (Petrop.) from material cultivated in 1815. Riedel sent it (whether the seed or the plant itself the label does not specify). It is a *Blainvillea* and may well have come from the material on which Desfontaines founded his reduction of *B. dichotoma* to synonymy in 1829.

Bidens formosa (Bon.) Schz. Bip. in Seemann, Bot. Voy. Herald 307. 1852–1857.=*Cosmos bipinnatus* Cav. Icon. et Descr. Pl. 1: 10, *pl. 14.* 1791.

Bidens formosa (Bon.) O. Kuntze, Rev. Gen. 3, pt. 2: 137. 1898. =*Cosmos bipinnatus* Cav. loc. cit.

Bidens frutescens Mill. Gard. Dict. ed. 8. No. 4. 1768.=*Zexmenia frutescens* (Mill.) Blake cum var. *genuina* Blake, Contr. Gray Herb. n. ser. 52: 50. 1917.

Bidens fruticosa L. Sp. Pl. 2: 833. 1753.=*Zexmenia frutescens* (Mill.) Blake cum var. *genuina* Blake, loc. cit.

Bidens fusca Lam. Encycl. 1: 416. 1783.=*Spilanthes oleracea* L. Syst. Nat. ed. 12. 2: 534. 1767 (fide Spreng. Syst. Veg. 3: 444. 1826; etiam A. H. Moore, Proc. Amer. Acad. 42: 534. 1907).

Bidens Glyceriaefolia Schz. Bip. ex Sherff, Bot. Gaz. 76: 78. 1923. =*Isostigma Scorzoneraefolium* (Bak.) Sherff, Bot. Gaz. 81: 246. 1926.

Bidens Glycinaefolia Schz. Bip. ex Baker in Mart. Fl. Bras. 6, pt. 3: 247. 1884.=*Isostigma Scorzoneraefolium* (Bak.) Sherff, loc. cit.

Bidens gracilis Torr. Ann. Lyc. N. Y. 2: 215. 1828.=*Thelesperma gracile* (Torr.) Gray, Kew Journ. Bot. 1: 252. 1849.

Bidens hirsuta Sw. Prodr. Veg. Ind. Occ. 110. 1788.=*Notoptera hirsuta* (Sw.) Urban, Symb. Antill. 2: 466. 1901 (cf. O. E. Schulz in Urban, op. cit. 7: 144. 1911).

Bidens Humboldtii Schz. Bip. in Seemann, Bot. Voy. Herald 307. 1852–1857=*Cosmos parviflorus* (Jacq.) H.B.K. Nov. Gen. et Sp. 4: 189 (241). 1820.

Bidens insipida (Jacq.) Lam. Encycl. 1: 416. 1783.=*Spilanthes insipida* Jacq. Enum. Pl. Carib. 28. 1762; Sel. Stirp. Amer. Hist. 215, *pl. 126, fig. 2.* 1763 (cf. A. H. Moore, Proc. Amer. Acad. 42: 530. 1907).

Bidens involvens Phil. ex Ind. Kew. Suppl. 1: 56. 1901. Clearly a sphalm for *B. involucrata* Phil. which is the name given in the place cited (Anal. Mus. Nac. Chile Bot. 49. 1891) and which = *Heterosperma involucratum* (Phil.) Reiche, Anal. Univ. Chile 112: 150. 1903; etiam Fl. Chile 4: 99. 1905.

Bidens involucrata Phil. Anal. Mus. Nac. Chile Bot. 49. 1891.= *Heterosperma involucratum* (Phil.) Reiche, locis cit.

Bidens Jacksonii (S. L. Moore) Sherff, Bot. Gaz. 81: 45. 1926.= *Coreopsis Jacksonii* S. L. Moore, Journ. Linn. Soc. 35: 347. 1902; cf. Field Mus. Bot. 11: 363 (and *fig. 1*, the legend of which through errror fails to show Moore as the sole authority for the binomial as printed).

Bidens Langlassei Sherff, Bot. Gaz. 64: 24. 1917.=*Cosmos Langlassei* Sherff, Field Mus. Bot. 8: 425. 1932.

Bidens Leyboldii Phil. Anal. Univ. Chile 27: 338. 1865.=*Thelesperma megapotamicum* (Spreng.) O. Kuntze, Rev. Gen. 3, pt. 2: 182. 1898 (cf. Sherff, Bot. Gaz. 76: 91–93. 1923.[1]

Bidens Lindleii Schz. Bip. in Seemann, Bot. Voy. Herald 307. 1852–1857 (*B. Lindleyi* Schz. Bip. in Ind. Kew. 1: 301. 1895). (=*Cosmos tenuifolius* Lindl. Bot. Reg. *pl. 2007*. 1837—and hence) =*Cosmos bipinnatus* Cav. Icon. et Descr. 1: 10. *pl. 14*. 1791.

Bidens linearifolia Schz. Bip. in Seemann, loc. cit. =*Cosmos linearifolius* (Schz. Bip.) Hemsl. Biol. Centr. Amer. Bot. 2: 200. 1881.

Bidens marginata Perr. ex DC. Prodr. 5: 631. 1836. =*Chrysanthellum indicum* DC. Perrottet's specimen of *B. marginata* was made the basis by DeCandolle for his *Chrysanthellum senegalense*, but this is reduced to *C. indicum* by the *Index Kewensis* (1: 525. 1895).

Bidens megapotamica Spreng. Syst. Veg. 3: 454. 1826; non O. E. Schulz, Bot. Jahrb. 50, Suppl.: 182. 1914. =*Thelesperma megapotamicum* (Spreng.) O. Ktze. Rev. Gen. Pl. 3, pt. 2: 182. 1898 (cf. Sherff, Bot. Gaz. 76: 91. 1923; ibid. 83: 425. 1927).

Bidens melananthera hastata (Michx.) Desf. Tabl. Ecole Bot. ed. 2. 130. 1815 =*Melanthera* (spelled in Michx. *Melananthera*) *hastata* (Walt.) Michx. Fl. Bor. Amer. 2: 107. 1803.

Bidens Meyeniana Walp. Nov. Act. Nat. Cur. 19, Suppl. 1: 271. 1843; Walp. Repert. 6: 168. 1846. =*Glossogyne tenuifolia* (LaBill.) Cass. Dict. Nat. Sci. 51: 475. 1827. The type of *Bidens Meyeniana*, collected by Meyen at Cape Syngmoon, Kwangtung, China, August, 1831, is preserved in the Berlin Herbarium. Walpers described it as being nearest *B. parviflora* Willd., wherefore Forbes and Hemsley (Journ. Linn. Soc. 23: 435. 1888) stated that it might be referable to *B. parviflora* or to *B. bipinnata*. The plant, however, is typical *Glossogyne tenuifolia* Cass., and the species has already been thus equated on a label for another specimen (legit Hillebrand) by someone in the Berlin Herbarium (cf. Sherff, Bot. Gaz. 76: 91. 1923).

[1] For a further note upon the validity of the name *Thelesperma megapotamicum*, vide Sherff, Bot. Gaz. 83: 425. 1927.

Bidens mirabilis Sherff, Bot. Gaz. 61: 496. *pl. 31.* 1916. = *Ericentrodea mirabilis* (Sherff) Blake & Sherff ex Blake, Journ. Wash. Acad. Sci. 13: 105. 1923. Cf. Sherff, Bot. Gaz. 81: 26, footnote 1. The footnote in question was meant to include also the latinized description of *Ericentrodea* and the citation of the type species. These, however, were erroneously placed by the printer in the body of the text.

Bidens nivea L. Sp. Pl. 833. 1753 (non Sessé & Moc.) = *Melanthera nivea* (L.) O. E. Schulz in Urban, Symb. Antill. 7: 118. 1911 (ex syn. L.).

Bidens novae-caledoniae Forst. ex Schlect. Linnaea 10: 480. 1835–1836. = *Glossogyne tenuifolia* (LaB.) Cass. Dict. Sci. Nat. 51: 475. 1827.

Bidens ochracea (O. Hoffm.) Sherff, Bot. Gaz. 76: 158. 1923. = *Coreopsis ochracea* O. Hoffm. Bot. Jahrb. 30: 431. 1901 (cf. Sherff, op. cit. 80: 375. *pl. 19.* 1925). Hoffmann had not seen ripe fruits of this species.[1] In my earlier studies it seemed that the specimens of this handsome species of the Nyassa region were of two kinds, differing generically on the basis of the winged character of the achenes. Further specimens have shown that some material is merely more tardy than the rest in displaying achenial wings. As the specimens mature, their achenes become fairly well winged. Besides the type (*W. Goetze* 731, on red laterite, hilly plateau, in thin bush growth, at altitude of 1,700 meters, Bweni, Uhehe, March 11, 1899; Berl.), I have seen the following: *Ad. Stolz* 764 pro parte, growing 2 meters tall, alt. 600 meters, Kyimbila, Langenburg, German East Africa, June 8, 1911 (Berl.); *idem* 764 pro parte, eodem loco, February 27, 1912 (Del.); *Muenzner* 159, Msamvia, Lake Tanganyika District, German East Africa, February 24, 1909 (Berl.; type of *Coreopsis Cosmophylla* Sherff); *A. Whyte,* northern Nyassaland (Kew); *E. Battiscombe* 83, alt. 1,050–1,200 meters, Muhoroni, British East Africa (Kew; forma foliis plus minusve atypica); W. H. Nutt, alt. about 1,800 meters, between Lake Tanganyika and Lake Rukwa, 1896 (Kew).

Bidens Ocymifolia Lam. Encycl. 1: 416. 1783; Lam. & Poir. Illustr. Gen. 3: 244, *pl. 668, fig. 3.* 1823. = *Spilanthes Ocymifolia* (Lam.) A. H. Moore, Proc. Amer. Acad. 42: 531. 1907. Here, as elsewhere in similar cases unless noted to the contrary, I have preferred to rely upon Moore's special knowledge of the various species of *Spilanthes.* I examined the Lamarckian specimen in 1924 (Par.) and noted in manuscript merely that it was a *Spilanthes.*

[1] "Reife Früchte fehlen; nach den Fruchtknoten zu erteilen könnten sie geflügelt sein": Hoffm. loc. cit.

Bidens oleracea (L.) Cav. ex Steud. Nom. ed. 2. 1: 203. 1840. = *Spilanthes oleracea* L. Syst. Nat. ed. 12. 2: 534. 1767 (cf. A. H. Moore, op. cit. 530).

Bidens Palmeri Gray, Proc. Amer. Acad. 22: 429. 1887. = *Cosmos Landii* Sherff, Bot. Gaz. 64: 29. 1917. This species, with its strongly ribbed leaves, is very close to *Cosmos Crithmifolius* H.B.K., but differs in its yellow rays and slightly dissimilar leaf outline. In most specimens the achenes are clearly erostrate, but occasionally some of the central ones become highly elongated above, appearing almost distinctly rostrate and thus exactly simulating those of such species as *Cosmos Crithmifolius* and *C. linearifolius*. This is especially notable in certain material collected by Barnes and Land (Nos. 164 and 189, Field). In fact, the subrostrate character of the achenes was known to Gray (cf. Gray, loc. cit., "achaeniis subulatis . . . subrostratis"). Yet, curiously enough, he placed this species in *Bidens*, while previously (Proc. Amer. Acad. 19: 16. 1883) he had determined as *Cosmos Seemannii* a Ghiesbreght plant, described by himself as having "essentially beakless . . . achenes." I have examined the following specimens: *Edward Palmer* 315, Río Blanco, Jalisco, Mexico, August, 1886 (Gray; Phila.; U.V.); *C. G. Pringle* 2348, vicinity of Guadalajara, Jalisco, November 2, 1889 (Del.; Field; Phila.; U.V., 2 sheets); *idem* 11490, banks of ravines at alt. 1,525 meters, Río Blanco near Guadalajara, Jalisco, October 6, 1903 (Field); *C. R. Barnes & W. J. G. Land* 164 and 167, alt. 1,707 meters, Sierra de San Esteban, Jalisco, September 28, 1908 (Field); *iidem* 189, alt. 1,737 meters, eodem loco et tempore (Field).

Bidens paradoxa D. Don ex Hook. & Arn. in Hooker, Journ. Bot. 3: 319. 1840. = *Thelesperma megapotamicum* (Spreng.) O. Kuntze, Rev. Gen. Pl. 3, pt. 2: 182. 1898 (cf. Sherff, Bot. Gaz. 76: 91. 1923; ibid. 83: 425. 1927).

Bidens perianthomega Arrab. ex Steud. Nom. ed. 2. 1: 203. 1840. Erroneously given for *Bignonia perianthomega* Velloso, Fl. Flum. 248; 6: *pl. 34*. 1827 (cf. Ind. Kew. 1: 301. 1895).

Bidens Peucedanifolia (Wedd.) O. Kuntze cum var. *bipinnatisecta* O. Ktze. et var. *soratensis* O. Ktze. Rev. Gen. Pl. 3, pt. 2: 136–137. 1898. = *Cosmos Peucedanifolius* Wedd. Chlor. And. 1: 70. 1855.

Bidens Peucedanifolia var. *cochabambensis* O. Ktze. loc. cit. = *Cosmos Peucedanifolius* var. *cochabambensis* (O. Ktze.) Sherff, Bot. Gaz. 88: 307. 1929.

Bidens Peucedanifolia var. *tiraquensis* O. Ktze. loc. cit. = *Cosmos Peucedanifolius* var. *tiraquensis* (O. Ktze.) Sherff, Bot. Gaz. loc. cit.

Bidens pinnatifida Buch.-Ham. in Wall. Cat. No. 3190. 1828. = *Glossogyne pinnatifida* (Buch.-Ham. in Wall.) DC. in Wight, Contr. 19. 1834.

Bidens pseudacmella (L.) Zorn, Ic. Pl. Med. Cent. 6. *pl. 594.* 1790. = *Verbesina pseudo-acmella* L. Sp. Pl. 2: 901. 1753 (fide A. H. Moore, Proc. Amer. Acad. 42: 561. 1907).

Bidens pulcherrima Schz. Bip. Linnaea 34: 528. 1865–1866. = *Nomen subnudum.* Name applied by Schultz Bipontinus to *G. Mandon* 54, specimens of which (Gray; Brit.) are referable to *Cosmos Peucedanifolius* Wedd. Chlor. And. 1: 70. 1855.

Bidens purpurea DC., cum var. *glabriuscula* DC., Prodr. 5: 604. 1836. = *Cosmos purpureus* (DC.) Benth. & Hook. Gen. Pl. 2: 387. 1876; Hemsl. Biol. Centr. Amer. Bot. 2: 200. 1881 (cf. Sherff, Bot. Gaz. 80: 381. 1925).[1]

Bidens Ramtila Wall. Cat. 3191. 1828; *B. Ramtilla* Wall. ex DC. Prodr. 5: 551, 605. 1836. = *Guizotia abyssinica* Cass. Dict. Nat. Sci. 59: 248. 1829.

Bidens reptans Schz. Bip. in Seemann, Bot. Voy. Herald 308. 1852–1857 (non [L.] G. Don). = *Cosmos diversifolius* Otto in Knowles & Westc. Fl. Cab. 2: 3. *pl. 47.* 1838.

Bidens rhombifolia Schz. Bip. Bonplandia 4: 54. 1856 (nomen). = *Heterosperma rhombifolium* (Schz. Bip.) Griseb. Goett. Abh. 19: 138. 1874; cf. Sherff, Bot. Gaz. 76: 80. *pl. 8.* 1923. Schultz Bipontinus, who reduced *Heterosperma* to *Bidens,* published without description the name *Bidens* (*Heterosperma*) *rhombifolia* for a plant collected by W. Lechler, No. 1576, in rubbish-covered places, May, 1854, Tacna, Peru. Later Grisebach (loc. cit.) transferred the species to *Heterosperma,* supplying a very scant description: "Species parum ab *H. maritimo* Kth. foliis latioribus (2″ longis, 1″ latis) recedens."

The leaves of *H. maritimum* were described as 4–4.5 lines wide; those of *H. rhombifolium* are 7–9.3 lines wide, and because of this greater width have a remarkably different aspect. The achenes of the outer, perfect (hermaphrodite) florets in *H. maritimum* were described as obsoletely tridentate at the apex, but the corresponding achenes of *H. rhombifolium* are definitely biaristate.[2] In 1914, on

[1] *B. purpurea* Downing (Nat. Great L. Region 317. 1922) is an error for *Brasenia purpurea* Casp. (=*B. Schreberi* Gmel.).

[2] It should be remarked, however, that in the type plate, *fig. 3,* of *H. maritimum,* two definite aristae are shown on the achene. No tridentate character is indicated.

finding one of Lechler's original specimens in Paris, I made a drawing of it (Sherff, Bot. Gaz. 76: 80, *pl. 8.* 1923). The leaves suggested strongly the possibility of the plant's being the *Heterosperma ovatifolium* of Cavanilles, described from "Peru" in 1822 (Cav. Descr. 204. 1802), and later renamed *H. ovatum* by Willdenow (Sp. Pl. ed. 4. 3: 2129. 1804).[1] Cavanilles' description of the leaves, however, "Las hojas son aovadas, de cinco á ocho lineas de largo," shows his plant to have been one of the smaller-leaved species native to that region. In the Paris specimen of *H. rhombifolium* the principal leaves all measure from 9 to 16 lines long,[2] not 5–8 lines as given by Cavanilles. The plant, on comparison with Kunth's plate in Humboldt and Bonpland's *Nova Genera et Species Plantarum* (4: *pl. 383.* 1820), appears to differ from *H. maritimum* mainly in having large, rhombic-ovate instead of small, rhombic-lanceolate leaves.

Since the paucity of material in the larger herbaria makes it impossible actually to settle the separate identity of *H. rhombifolium* as distinct from *H. maritimum*, attempts at synonymizing the two would seem for the present to be valueless.

Bidens rigida Hort. Calc. ex C. B. Clarke, Comp. Ind. 141. 1876. = *Glossogyne pinnatifida* (Buch.-Ham. in Wall.) DC. in Wight, Contr. 19. 1834.

Bidens Sartorii Schz. Bip. in Seemann, Bot. Voy. Herald 307. 1852–1857. = *Cosmos Crithmifolius* H.B.K. Nov. Gen. et Sp. 4: 190 (242). 1820. I have examined Schultz Bipontinus' type (Par.).

Bidens Scabiosoides (H.B.K.) Schz. Bip. loc. cit. 308 (cf. Ortg. in Regel, Gartenflora 408. 1861). = *Cosmos Scabiosoides* H.B.K. Nov. Gen. et Sp. 4: 242. 1820.

Bidens scandens L. Sp. Pl. 833. 1753. = *Salmea scandens* (L.) DC. Cat. Hort. Monsp. 141. 1813 (cf. O. E. Schulz in Urban, Symb. Antill. 7: 144. 1911; cf. Blake, Journ. Bot. 53: 197. 1915).

Bidens Scorzoneraefolia Baker in Mart. Fl. Bras. 6, pt. 3: 247. 1884. = *Isostigma Scorzoneraefolium* (Baker) Sherff, Bot. Gaz. 81: 246, *pl. 23, figs. g, h.* 1926.

[1] In Cavanilles' description, the name "*Heterosperma ovatifolia*" [sic] appears not as a binomial but merely as the first two words of a short Latin description, followed by a longer Spanish description. Cavanilles' method of presenting his plant names in his *Descripciones* is not the orthodox post-Linnean one, and only by examination of his treatment of the many other plant names does one find surely that the first two words in each description are the intended binomial.

[2] Grisebach's measurements, "2″ longis, 1″ latis," appear to have been carelessly taken.

Bidens Seemannii Schz. Bip. in Seemann, Bot. Voy. Herald 307. 1852–1857.=*Cosmos Carvifolius* Benth. Bot. Voy. Sulph. 117. 1844 (cf. Sherff, Bot. Gaz. 64: 27. 1917; etiam 88: 303. 1929).

Bidens spathulata Sherff, Bot. Gaz. 76: 149. 1923.=*Coreopsis Jacksonii* S. L. Moore, Journ. Linn. Soc. 35: 347. 1902.

Bidens subalpina Larss. ex Kindb. Svensk Fl. 393. 1877.= *Betula intermedia* Thom. fide Kindb. loc. cit.

Bidens Succisaefolio Hemsl. in Ind. Curtis's Bot. Mag. 27. 1906. =*Coreopsis lanceolata* L. Sp. Pl. 908. 1753.

Bidens sulphurea (Cav.) Schz. Bip. op. cit. 308.=*Cosmos sulphureus* Cav. Icon. et Descr. Pl. 1: 56, *pl. 79*. 1791.

Bidens tenella L. Pl. Rar. Afr. 17. 1760; Amoen. Acad. 6: 96. 1760. The Linnean Herbarium has two plants on one sheet. They were identified long ago by Schultz Bipontinus as "*Pectis (tenella)*" and "*Charieis heterophylla* Cass."

Bidens tenuifolia LaBill. Sert. Austr. Caled. 44, *pl. 45*. 1825.= *Glossogyne tenuifolia* (LaBill.) Cass. Dict. Nat. Sci. 51: 475. 1827.

Bidens tinctoria (Nutt.) Baill. Hist. Pl. 8: 305. 1886; (Nutt.) Baill. ex Ind. Kew. 1: 301. 1895.=*Coreopsis tinctoria* Nutt. Journ. Acad. Phila. 2: 114. 1821.

Bidens tridentata Turcz. Bull. Soc. Nat. Mosc. 24, pt. 1: 183. 1851. =*Glossogyne tridentata* (Turcz.) Benth. & Hook. Gen. Pl. 2: 389. 1873.

Bidens tripteris (L.) Krause in Sturm, Fl. Deutschl. ed. 2. 13: 158. 1905.=*Coreopsis tripteris* L. Sp. Pl. 2: 908. 1753.

Bidens tuberosa Schz. Bip. Bull. Soc. Bot. Fr. 12: 79. 1865; Linnaea 34: 528. 1865–1866. Nomen subnudum. Applied by Schultz Bipontinus to *G. Mandon* 49, specimens of which (N.Y., etc.) are referable to *Viguiera fusiformis* Blake, Contr. Gray Herb. n. ser. 54: 145. 1918.

Bidens valladolidensis Schz. Bip. in Seemann, Bot. Voy. Herald 308. 1852–1857.=*Cosmos Crithmifolius* H.B.K. Nov. Gen. et Sp. 4: 190 (242). 1820.

Bidens variabilis (Desf.) Baill. Hist. Pl. 8: 305. 1886; etiam (Desf.) Gómez, Ann. Hist. Nat. Madrid 19: 275. 1890.=*Dahlia variabilis* Desf. Cat. Pl. Hort. Reg. Paris ed. 3. 182. 1829.

Bidens verticillata L. Sp. Pl. 833. 1753 (non [L.] Baill.).=*Trichospira verticillata* (L.) Blake, Torreya 15: 106. 1915.

Bidens verticillata (L.) Baill. Hist. Pl. 8: 305. 1886. =*Coreopsis verticillata* L. Sp. Pl. 907. 1753.

Bidens Xantiana Rose ex Vasey & Rose, Contr. U. S. Nat. Herb. 1: 72. 1890. = *Heterosperma Xantii* Gray, Proc. Amer. Acad. 5: 162 (cf. Sherff, Bot. Gaz. 61: 497, footnote 2. 1916). *Heterosperma* is very closely connected with *Bidens* through *Heterosperma Xantii* Gray, the type of which (Gray) is matched by that of *Bidens Xantiana* Rose (U.S.); a species best retained in *Heterosperma*, a view in accord with the treatment by Brandegee (Zoë 1: 309. 1890), who, moreover, has since positively corroborated (in lit., 1913) my equation of *Bidens Xantiana* Rose with *Heterosperma Xantii* Gray.

ADDENDA

71. *Bidens segetum* Mart. ex Colla, p. 194, Pl. XLIX and Pl. L. Colla's rare work (Herb. Pedem.) describing this species is inaccessible to me. Drs. Henry A. Gleason and Elmer D. Merrill very kindly sent me copied portions of the text. From the inscription ("*Bidens segetum* Mar.") accompanying Colla's type specimen and from Colla's citation of the herbarium of Martius ("14. B. segetum = Mart. hb.") as seen in these copies, though set forth somewhat unconventionally, it is evident that "Martius ex Colla" should be given for the authorship of the name *B. segetum*. (Similarly, *B. fervida* Hort. Erf. ex Colla is correct for the full citation of Colla's *B. fervida* on p. 366.)

147*a*. **Bidens Muelleri** sp. nov.

Herba pumila, perennis, e radice plus minusve perpendiculari 4–8 mm. crassa saltem 3 vel 4 cm. longa crescens, subacaulescens, ±5 cm. alta, subconferte subcaespitoseque foliata. Folia petiolata petiolis planis submarginatis glabris vel basim versus hispidis usque ad 3.5 cm. longis et 0.6–1 mm. latis, petiolo adjecto sub 5 cm. longa, lamina circumambitu deltoideo-ovata, bipinnatisecta; segmentis (primariis 1–3 jugis ad rhachin decurrentibus) lineari-oblongis, crassiusculis, obtusis vel subacutis, glabris, subrevolutis, majoribus uninerviis, 1–2 mm. latis. Capitula pauca (1–3), pedunculum scapoideum glabrum inferne arcuatum superne erectum 2–4 cm. longum et circ. 0.5 mm. crassum terminantia, radiata, pansa ad anthesin circ. 1.8–2.3 cm. lata et circ. 9 mm. alta. Involucri subhemisphaerici bracteae exteriores 6–8, lineari-oblongae, apice obtusae, tergo glabrae, marginibus glabri vel raro paulum spinuloso-ciliatae, 2–4 mm. longae et sub 1 mm. latae; interiores ovato-oblongae, anguste

flavo-marginatae aliter brunneo-nigrescentes, glabrae vel ad apicem minute pubescentes, circ. 8–9 mm. longae. Flores ligulati plerumque 8, aurei, ligula ovato-oblongi, apice obtuso plus minusve denticulati, ±1 cm. longi. Paleae plus minusve oblanceolatae, apice obtusae ±6 mm. longae. Achaenia matura absentia. Ovaria oblongo-fusiformia, plana, nitido-brunneae, glabrata, apice paulum dilatata vel etiam subbidenticulata sed non aristata, usque ad 2 mm. longa.

Type specimen: Collected by *C. H. Mueller*, No. 2267, abundant in meadows above timber line, on the peak of Cerro Potosí, Galeana, Nuevo León, Mexico, July 21, 1935 (Field).

Distribution: Known only from type locality in Nuevo León, Mexico.

Specimens examined: *Mueller 2267* (type, Field).

The type sheet bears seven specimens. The dried capitula offer an illusory resemblance to those of most South American species of *Coreopsis*, because of the conspicuous, dark interior involucral bracts. I am indebted to Mr. Paul C. Standley of Field Museum for opportunity to study this recently collected material (which he had very properly considered as representing a new species), and to prepare a detailed description for insertion in this work.—The affinities are probably closest with *B. Anthemoides*, *B. andicola*, and *B. triplinervia* var. *macrantha*.

185*a*. **Bidens Lindblomii** sp. nov.

Herba perennis, fruticosa, glabra, verisimiliter erecta et ±1 m. alta; caule subtereti vel parce subtetragono, inferne ac mediane simplici. Folia opposita, tenuiter petiolata petiolis glaberrimis 1–2 cm. longis basi connatis, petiolo adjecto saepius 6–9 cm. longa, 3–5-partita; foliolis plus minusve ovatis vel rhomboideo-ovatis, obtusis, paucidentatis (dentibus suborbiculato-ovatis saepe mucronulatis), membranaceis, eciliatis vel obsoletissime ciliatis, 1–3.5 cm. latis. Capitula ±11–13 corymboso-paniculate disposita, radiata, pansa ad anthesin 3–4 cm. lata et circ. 12–13 mm. alta, tenuiter pedicellata pedicellis glabris usque ad 9 cm. longis. Involucri plus minusve glabri bracteae exteriores circ. 5 vel 6, patentes vel reflexae, oblongo-lineares, apice subobtusae, circ. 4–5 mm. longae; interiores ovato-oblongae, 6–7 mm. longae. Flores ligulati circ. 8, flavi, ligula obovato-oblongae vel late ellipticae, apice subdenticulati, 1.6–2 cm. longi. Paleae lineari-oblongae, acutae vel obtusae, ±7 mm. longae. Achaenia matura non visa. Ovaria ±4 mm. longa, linearia, plana, basim versus angustata, faciebus glabra, marginibus erecte setosa,

apice setis erectis coronata et bi- vel plerumque triaristata; aristis elongato-filiformibus, de apice fere usque ad basim acriter retrorsumque hamosis, 4–5 mm. longis.

Type specimen: Collected by *K. G. Lindblom*, in Ukamba, British East Africa, 1911–1912 (Stockh.).

Distribution: Known only from type locality in Ukamba, British East Africa.

Specimens examined: *K. G. Lindblom*, Ukamba, 1911–1912 (type, Stockh.).

The type was found, on the eve of publication, among a large assortment of undetermined specimens received from Th. Arwidsson of the Natural History Royal Museum of Stockholm. In my *Clavis* it runs down to the second *i* on page 65. From the specimens there given, however, it differs at once in one or more of the characters noted: glabrous stem and leaves, corymbose-paniculate inflorescence, capitula 3–4 cm. wide and about 12–13 mm. tall, exceptionally elongate-filiform and retrorsely barbed aristae of the usually triaristate ovaries, etc.

INCERTAE SEDIS

Bidens grandiflora var. γ. *longiloba* O. Ktze. Rev. Gen. 3, pt. 2: 136. 1898. "Folia plurima 2–3-pinnatisecta lobis longis integris anguste lanceolatis. Bolivia: Cochabamba."

Bidens ingrata Larrañaga ex Escritos D. A. Larrañaga (Publ. Inst. Hist. Geogr. Uruguay) 2: 250. 1923. "Floribus 1–2 radiatis, calicibus nudis, foliis pinnatis, superioribus pinnatifidis; glabris caule tetragono."

Bidens Martii Colla, Herb. Pedem. 3: 306. 1834.

Bidens Maximowicziana Oetting. Act. Hort. Bot. Univ. Imp. Jurjuv. 6: 219, pl. 3, fig. 1. 1905. Doubtless is *Bidens radiata* Thuill.

Bidens odora Willd. Enum. Hort. Berol. Suppl. 56. 1813.

Bidens paleacea Vis. Nuov. Saggi Acc. Padov. 5: 266. 1840. Native of Nubia. "Gehört nach der Beschreibung in den Formenkreis von *B. pilosus* L."—O. E. Schulz, Bot. Jahrb. (Suppl.) 50. 183. 1914.

Bidens tetragona Sessé & Moc. Pl. Nov. Hispan. ed. 1. 131. 1887. A plant described from San Angel, near the City of Mexico (stem quadrangulate-alate, leaves rhombic-lanceolate, peduncles solitary and terminal, capitula yellow and radiate, etc.). Belongs clearly in

another genus. An authentic specimen is lacking among the large collection of Sessé & Mocino plants recently sent from the Madrid Botanical Garden to Field Museum for study.

Bidens trifoliata Noronha, Verh. Batav. Gen. 5 (ed. 1, art. IV?): 8. 1790. Nomen nudum. Probably *B. pilosa* L. or one of its varieties.

Bidens trifoliata Gueldenstadt, Reis. Russl. Cauc. Geb. 2: 9. 1791: Guldenst. ex Ledeb. Fl. Ross. 2: 516. 1844–1846. Nomen nudum. Probably *B. tripartita* L., for which it is cited as a synonym by Ledebour, loc. cit.

Bidens Vestii Schz. Bip. Flora 39: 358. 1856; *Coreopsis fruticosa* Vest, Flora 3: 7. 1820; *Bidens fruticosa* (Vest) DC. Prodr. 5: 596. 1836; non (Forst.) Schz. Bip. loc. cit. A glabrous plant, of unknown origin. The leaves were oblong, lanceolate, dentate. The stem was shrubby. The rays numbered up to 12. The achenes were smooth, 4-aristate, the aristae retrorsely barbed. Vest described the plant as having been planted in his garden under the name *Iva frutescens* and brought probably from Vienna.

Bidens Viciosoi Pau, Bol. Soc. Arag. 7: 78. 1908. Should be compared with *Bidens pilosa* L.

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